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MONTGOMERY WATSON

January 11, 2001

Mr. Eric Runkel
Illinois Environmental Protection Agency
1021 North Grand Ave.
Springfield, Illinois

Re: Beloit Corporation NPL Site

Dear Mr. Runkel:

Please find enclosed 5 copies of the Final Baseline Risk Assessment. We have also sent 3 copies of the Baseline Risk Assessment to the U.S. EPA and 2 copies to the Illinois Attorney General's office. We have revised the Baseline Risk Assessment to include the revisions, as sent to you on November 13, 2000, and accepted in your December 7, 2000 letter concerning conditional approval of the Baseline Risk Assessment.

If you have any questions regarding this final document, please do not hesitate to contact me.

Sincerely,

MONTGOMERY WATSON

Kenneth J. Quinn
Project Manager

Enclosure: Final Baseline Risk Assessment for the Beloit Corporation NPL Site

cc: Mr. Kevin Domack - Harnischfeger Industries, Inc. (1)
Mr. Jack Fishman - Beloit Corporation. (1)
Mr. Doug McLiesh - Beloit Corporation (1)
Mr. Frederick Mueller - Johnson and Bell (1)
Mr. Kevin Phillips - Ecology and Environment (1)
Mr. Terry Ayres – IEPA (letter only)
Mr. Paul Jagiello - IEPA (letter only)
Ms. Maria Menotti - IAG (2)
Terese VanDonsel - U.S. EPA (3)
Mr. Jeffrey Cahn - U.S.EPA (letter only)

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Baseline Risk Assessment Report

BELOIT CORPORATION
Blackhawk Facility
Rockton, Illinois

JANUARY 2001

Prepared For:

Beloit Corporation
Rockton, Illinois

Prepared By:

Montgomery Watson
Madison, Wisconsin

FINAL

BASELINE RISK ASSESSMENT

BELOIT CORPORATION
BLACKHAWK FACILITY
ROCKTON, ILLINOIS

January 2001

Prepared For:
Beloit Corporation
Rockton, Illinois

•••

Prepared By:
Montgomery Watson
Madison, Wisconsin

Project No. 1242077.16180101

BASELINE RISK ASSESSMENT

BELOIT CORPORATION
BLACKHAWK FACILITY
ROCKTON, ILLINOIS

January 2001

Prepared by: _____ 1-10-01
Michael W. Kierski — Date
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Principal Environmental Scientist

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF DRAWINGS

Drawing No.	
1242077.08090160-A2	Site Location Map
1242077.08090160-A6	Total Chlorinated VOCs November 1995 - July 1996
1242077.08090160-A7	Degradation Pathways
1242077.08090160-F4	Existing Features Map
1242077.08090160-F5	Surface Drainage and Site Topography
1242077.08090160-F10	Top of Clay Map
1242077.08090160-F11	Water Table Map (August 26, 1994)
1242077.08090160-F12	Water Table Map (November 15, 1995)
1242077.08090160-F13	Water Table Map (July 18, 1996)
1242077.08090160-F14	Soil Boring and Sampling Locations Map

LIST OF APPENDICES

Appendix

A - Summary of Analytical Data
- Table A-1 Summary of Soil Data - On Beloit Corporation Property
- Table A-2 Summary of Soil Data - Off Beloit Corporation Property
- Table A-3 Summary of Monitoring Well Data
- Table A-4 Summary of Private Well Data

B - Toxicity Profiles
C - Shower Scenario Back-Up
D - Chemical-Specific Health Risk Estimates
E - Photographs
F - Data Quality Summary
G - Ecological Risk Assessment Supplementary Information

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LIST OF ACRONYMS

1,1,1-TCA	1,1,1-trichloroethane
1,1-DCA	1,1-dichloroethane
1,1-DCE	1,1-dichloroethane
1,2-DCA	1,2-dichloroethane
AWQC	Ambient Water Quality Criteria
BCBF	Beloit Corporation – Blackhawk Facility
BCRC	Beloit Corporation Research Center
bgs	below ground surface
BlRA	Baseline Risk Assessment
BCP	Beloit Corporation Plant
CDIs	Chronic Daily Intakes
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfs	cubic feet per secondcolony forming units per gram
cis-1,2-DCE	cis-1,2-dichloroethene
cm^2	square centimeters
cm/s	centimeters per second
COPCs	chemicals of potential concern
COPECs	chemicals of potential ecological concern
CR	Cancer Risk
CSF	cancer slope factor
CVOCs	chlorinated volatile organic compounds
cy	cubic yards
DO	dissolved oxygen
E&E	Ecology and Environment, Inc.
EE/CA	Engineering Evaluation/Cost Analysis
ERA	Ecological Risk Assessment
ES	Enforcement Standards

FI	fraction ingested
FS	Feasibility Study
FSDA	Foundry Sand Disposal Area
FSSA	Former Fiber Sludge Spreading Area
ft.	feet
ft/day	feet per day
ft/min	feet per minute
gal	gallons
GC	gas chromatography
GP	Gravel Pit
gpm	gallons per minute
HEASTs	Health Effects Assessment Summary Tables
HHE	Human Health Evaluation
HI	Hazard Index
HQ	Hazard Quotient
HVAC	heating, ventilation, and air conditioning
IDPH	Illinois Department of Public Health
IEPA	Illinois Environmental Protection Agency
in.	inches
IRIS	Integrated Risk Information System
ISCA	Interim Source Control Action
LOAEL	Lowest Adverse Effect Level
MCLs	maximum contaminant levels
MCLs	Maximum Contaminant Levels
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mg/m^3	milligram per cubic meter
mL/hr	milliliters per hour
NCP	National Contingency Plan
ND	non-detect

NFA	No Further Action
NOAEL	No Adverse Effect Level
NPDES	National Pollutant Discharge Elimination System
NPL	National Priorities List
NWI	National Wetlands Inventory
O&M	operation and maintenance
OSWER	Office of Solid Waste and Emergency Response
PAHs	Polycyclic Aromatic Hydrocarbons
PAL	Preventive Action Limit
PCBs	polychlorinated biphenyls
PCE	tetrachloroethylene
PEF	particulate emission factor
PID	photoionization detector
POTW	publicly owned treatment works
QAPP	Quality Assurance Project Plan
RAGS	Risk Assessment Guidance for Superfund
RBCs	Risk Based Concentrations
RCL	Residual Contaminant Levels
redox	reduction/oxidation
R_f	retardation factor
RfD	reference dose
RI/FS	Remedial Investigation/Feasibility Study
RME	reasonable maximum exposure
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
SFs	slope factors
SQL	sample quantitation limit
sq ft	square feet
sq. yd.	square yards
SVOCs	semivolatile organic compounds

SYA	Storage Yard Area
TCE	trichloroethylene
trans-1,2-DCE	trans-1,2-dichloroethene
ug/L	micrograms per liter
U.S. EPA	United States Environmental Protection Agency
U.S. FWS	United States Fish and Wildlife Service
VOCs	volatile organic compounds
WWTP	Waste Water Treatment Plant
yd^3	cubic yards

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1.0 INTRODUCTION

Montgomery Watson (formerly Warzyn) was retained to perform a Baseline Risk Assessment (BlRA) for the Beloit Corporation National Priorities List (NPL) Site in Winnebago County, Illinois on behalf of Beloit Corporation in accordance with a Consent Decree by and between Beloit Corporation and the Illinois Environmental Protection Agency (IEPA). The Consent Decree became effective on October 17, 1991 and was amended on September 2, 1996. The objective of the BlRA is to characterize potential risks to human health and the environment to support the Feasibility Study's (FS) objective to evaluate final remedies.

The area of the NPL Site is located in Rockton Township, in north-central Illinois (Drawing A2). The NPL Site lies in a mixed industrial and residential area adjacent to and within the Village of Rockton (Village). The NPL Site occupies part of the northern half of Section 13 and the southeast quadrant of Section 12, T46N, R1E, Winnebago County, Illinois.

The NPL Site, as defined by the Consent Decree, is bounded on the north by Prairie Hill Road, on the west by the Rock River, on the south by a line projected from the Rock River along the south edge of a Village of Rockton easement and access road for the village water tower to Blackhawk Boulevard, and on the east by Blackhawk Boulevard. The NPL Site area includes Beloit Corporation property (Property), the neighboring Blackhawk Acres subdivision, the former Soterion/United Recovery facility (Soterion), a portion of Taylor, Inc. and Safe-T-Way (Drawing A2).

This report presents the findings of the BlRA, which explored human health and ecological risks resulting from potential exposures to chemicals detected during the Remedial Investigation (RI) activities. Exposure and risk estimates are based on the applicable data collected during the Phase I, Phase II, Phase III, and Phase IV RI field investigations (Warzyn 1993; Montgomery Watson 1995, 1997, and 1998). This BlRA expands on the Streamlined Risk Evaluation presented in the Engineering Evaluation/Cost Analysis (EE/CA) (Montgomery Watson 1995b) completed in 1995 and prepared by Montgomery Watson.

The BlRA was conducted in accordance with Subpart E, Section 300.430(d) of the revised National Contingency Plan (NCP) as promulgated on March 8, 1990 (U.S. EPA, 1990). Paragraph (d)(4) of this section of the NCP directs that a BlRA be conducted to characterize the actual and potential threats to public health and the environment that may be posed by chemicals migrating to groundwater or surface water, released to air, leaching through soil, remaining in the soil, and bioaccumulating in the food chain. The risk assessment is consistent with relevant guidance and standards developed by the United States Environmental Protection Agency (U.S. EPA, 1986a, b, 1989a, b, 1991a, 1992a, b). The results of the BlRA are intended to assist in making risk management decisions

concerning the necessity for remediation, the nature and extent of remediation and selection of remedial alternatives.

1.1 BASELINE RISK ASSESSMENT SCOPE AND APPROACH

The scope of this BlRA addresses chemicals of potential concern detected in the media located at the NPL Site that may pose risks to human health and the environment. These media include soils (both surface and subsurface), groundwater, and surface water and sediment in the Rock River (which borders on the NPL Site). It should be noted that within this section of the report, risks are characterized no matter where the source of the chemical impacts originated from on the NPL Site. First, the potential risks associated with chemically impacted soil and groundwater on the Beloit Corporation property have been assessed. In addition, the risks associated with Rock River sediments and surface water, and groundwater off the Beloit Corporation Property have also been assessed. This additional risk information is provided for informational purposes to satisfy the requirement of the Consent Decree to characterize the potential health risks on the NPL Site.

IEPA issued an Action Memorandum for Beloit Corporation to implement an Interim Source Control Action on the Beloit Corporation property. The EE/CA (Montgomery Watson 1995b) recommended and approved action is a groundwater pump and treatment system to contain groundwater on the Beloit Corporation property. The Interim Source Control Action (i.e., the pump and treatment system) went on line on July 2, 1996 (Montgomery Watson 1996) and will likely become part of the final remedy at the site.

South of the NPL Site, the residences are served by the Village of Rockton municipal water supply, and therefore have no potential to be exposed to chemically impacted groundwater. In 1998, however, the Village of Rockton and Beloit Corporation identified ten properties with private wells (i.e., were not utilizing the municipal water supply). One of these private wells, located at 630 North Blackhawk, was found to have water impacted by VOCs. This residence was hooked-up to the Rockton municipal water supply in 1999, and the private well was abandoned. The other nine are currently unaffected based on groundwater test results.

Four residences with VOCs in excess of maximum contaminant levels (MCLs), located within the Blackhawk Acres subdivision on the NPL site, have had point-of-entry treatment systems installed in their homes, which are maintained and monitored by the IEPA. These systems mitigate exposure by treating and effectively reducing VOC concentrations in the raw water to levels below Federal drinking water standards. The point-of-entry treatment systems were installed in 1993. Prior to installation of point-of-entry treatment systems, these residents were on bottled water. The point-of-entry treatment systems will remain in place until chemical concentrations in the local groundwater reach levels which no longer require treatment.

Considering the actions that have already been taken to minimize exposure to groundwater containing VOCs above the Federal drinking water standards, the approach for assessing risks to groundwater have accordingly been modified. Based on the NPL Site conditions, no exposure to VOCs in groundwater for those four wells on the point-of-entry treatment systems is occurring or would be expected to occur. For this reason, the risk associated with the wells on the point-of-entry treatment systems under current NPL Site conditions are discussed qualitatively. In addition, for informational purposes the risks associated with hypothetical consumption of the impacted groundwater from wells currently on a point-of-entry treatment system have been quantitatively assessed under hypothetical future conditions.

Some wells exist in the Blackhawk Acres subdivision with VOCs below MCLs. For wells with chlorinated VOCs below MCLs and not on point-of-entry treatment systems, the risk associated with consuming the groundwater has been quantified under present conditions.

In addition under a hypothetical future residential land use scenario on the Beloit Corporation property, the risk associated with the use of the shallow groundwater (as measured through monitoring wells on site) has been provided for informational purposes. There is no intention to use this shallow groundwater as a drinking source as the property is supplied with water drawn from deep wells that are unaffected by the shallow chemically impacted groundwater.

1.2 ORGANIZATION OF THE BASELINE RISK ASSESSMENT

The BlRA is composed of an evaluation of human health risk, as well as the uncertainty associated with the health risk estimates. The BlRA is organized as follows:

- Section 2.0 Summary of Remedial Investigation Results - Provides a summary of the Remedial Investigation (RI) conducted at the NPL site.

- Section 3.0 Identification of Chemicals of Potential Concern. The chemicals detected in applicable media investigated during the RI are identified and discussed. Based on an evaluation of the data and a comparison to blank concentrations, chemicals of potential concern are selected for further evaluation.

- Section 4.0 Toxicity Assessment. The methodology used to describe the potential toxicity of chemicals to humans and the range of toxic effects for each chemical of potential concern is presented. Chemical-specific toxicity criteria to be used in the quantitative risk assessment are presented.

- Section 5.0 Human Exposure Assessment. The potential pathways by which human populations may be exposed to chemicals of potential concern are discussed and exposure pathways are selected for further evaluation. For each pathway selected for quantitative evaluation, the chemical concentrations at the

point of potential exposure are estimated. The magnitude, frequency, and duration of exposure are estimated for each pathway, and exposures are quantified.

- Section 6.0 Risk Characterization. The general principles of the risk assessment process are described. For each exposure pathway selected for evaluation, quantitative risk estimates are developed by combining the estimated exposure values for potentially exposed populations with toxicity criteria.

- Section 7.0 Screening Level Ecological Risk Assessment. Provides a screening level ecological assessment for those areas of the NPL site, which contain ecological habitats.

- Section 8.0 Discussion of Uncertainties. This discussion focuses on the major sources of uncertainty affecting the health risk assessment.

- Section 9.0 Summary and Conclusions. Summarizes the results of the BlRA.

- Section 10 References. Provides the literature cited within the BlRA.

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2.0 SUMMARY OF REMEDIAL INVESTIGATION

2.1 REMEDIAL INVESTIGATION

The RI proceeded in a phased investigation approach where data collected during each phase of investigation were evaluated and subsequent investigation activities were then based on the results of the previous investigations. The activities conducted during the four phases of investigation were completed in accordance with methods outlined in the approved planning documents. A summary of activities, methods, and results are included in the technical memoranda prepared for the investigations. These are included in the appendices of the RI report (Montgomery Watson 1999).

The objectives of Phases I and II of the RI (Warzyn 1993, Montgomery Watson 1995) were to identify and investigate the potential source area(s) of VOCs identified at the NPL Site. The objective of the Phase III investigation was to determine the extent of VOC migration in groundwater (Montgomery Watson 1997). The objectives of Phase IV of the RI were to evaluate potential sources of the deep TCE plume, identify if VOCs detected at 1102 Blackhawk Blvd. were migrating from an upgradient source area, and to determine the effect the ISCA was having on the southern portion of the Blackhawk Acres Subdivision (Montgomery Watson 1998). The investigations were completed using methods contained within the planning documents approved by the IEPA. Data collected during the above mentioned investigations and specific methods utilized during the investigations are summarized in the technical memoranda produced from the investigations. These technical memoranda are included in the Appendices of the RI report (Montgomery Watson 1999), and summarized in Section 2.2 of this BlRA.

2.1.1 Phase I

The objectives of the Phase I investigation were to collect data at many areas at the NPL Site to determine if these areas were potentially contributing to VOCs previously detected in groundwater.

Investigation of groundwater, and surface and subsurface soils was conducted in the areas within the NPL site. The work plans did not include investigation of Taylor Inc. located on the southern boundary of the NPL Site, nor Safe-T-Way. Field screening, with a lab model gas chromatograph (field GC), of soil gas and groundwater was conducted to refine the investigation as it proceeded.

Technical Memorandum 1 (Warzyn 1993) provides details on Phase I field methods, laboratory data, data validation and summarizes results of the investigation. This Technical Memorandum is included as Appendix A of the RI report (Montgomery Watson 1999). The results of the Phase I investigation were used to determine the investigative activities for the Phase II investigation.

2.1.2 Phase II

The objective of the Phase II investigation was to evaluate potential source areas while identifying areas where VOCs may have been released. Several potential source areas were identified on the property and targeted for investigation based on the results of the Phase I investigation. The potential source areas investigated included the Foundry Sand Disposal Area (FSDA), former Fiber Sludge Spreading Area (FSSA), Storage Yard Area (SYA), and Beloit Corporation Plant (BCP).

Investigation of groundwater and surface and subsurface soils was conducted in the areas mentioned above. Investigations at the erection bay, former dry well and former loading dock included extensive drilling inside the BCP building. Field GC screening of soil gas, soil samples, and groundwater was conducted to refine the investigation as it proceeded.

Technical Memorandum 2 provided details on Phase II field methods, laboratory data, data validation and summarizes results of the investigation (Montgomery Watson 1995). This Technical Memorandum is included as Appendix B of the RI report (Montgomery Watson 1999). The results of the Phase II investigation were used to determine the investigative activities for the Phase III investigation.

2.1.3 Phase III

The objective of the Phase III investigation was to determine potential VOC migration pathways in groundwater and was not intended to further characterize the VOCs in soil or groundwater at the BCP erection bay where elevated levels of VOCs were found during Phase II.

Technical Memorandum 3 (Montgomery Watson 1997) provides details on Phase III field methods, laboratory data, data validation and summarizes results of the investigation. This Technical Memorandum is included as Appendix C of the RI report (Montgomery Watson 1999). The results of the Phase III investigation were used to determine the investigative activities for Phase IV.

2.1.4 Phase IV

The objectives of the Phase IV investigation were to evaluate potential sources of the deep TCE plume, to identify if VOCs detected at 1102 Blackhawk Blvd. were migrating from an upgradient source area, and to determine the effect the ISCA was having on groundwater capture in the southern potion of the Blackhawk Acres subdivision.

Technical Memorandum 4 (Montgomery Watson 1998) provides details on Phase IV field methods, laboratory data, data validation and summarizes results of the investigation. This Technical Memorandum is included as Appendix D of the RI report (Montgomery Watson 1999).

2.1.5 Meteorological Investigation

The only specific meteorological investigations which were conducted at the site during the RI was rainfall and barometric pressure readings during the ISCA evaluation. Information was collected concerning the general meteorological conditions in the vicinity of the site and is included in Section 3.1.2 of the RI report (Montgomery Watson 1999).

2.1.6 Surface Water/Sediment Investigation

River stages were measured periodically throughout the RI, along with groundwater levels, to determine the effects of the river on the shallow aquifer. A field reconnaissance was conducted over the site on August 17, 1992 to identify general surface water runoff drainage patterns. The results of the surface water/sediment investigation are contained in Section 4.0 of the RI Report (Montgomery Watson 1999).

2.1.7 Geologic Investigation

Geologic investigations conducted at the site include geotechnical borings, soil borings, surface and borehole geophysics and groundwater quality borings. Numerous soil samples collected during the RI were submitted to the geotechnical laboratory for grain size analysis. These data were used to complete boring logs and interpret the geologic setting of the site. Results of the geologic investigation are presented in Section 3 of the RI report (Montgomery Watson 1999).

2.1.8 Soil and Vadose Zone Investigation

During Phase I and Phase II, soil gas investigations in the vadose zone were completed to determine potential source areas.

Samples collected from soil borings during Phase I were screened using the field headspace screening method and a photoionization detector (PID) to determine which samples would be submitted to the laboratory for analysis. During Phase II, samples were collected at five foot intervals in soil borings and screened using the field GC. Results from the field GC screening were used to identify VOCs and potential source areas which required further investigation and to determine which samples would be submitted to the laboratory for analysis.

Surface soil samples were collected at soil borings, soil gas and background locations during Phase I. Surface soil samples were collected on the property in the SYA, FSSA, and FSDA as well as at background locations outside of the site during Phase II. Surface Soil sampling was conducted primarily in support of this BlRA.

2.1.9 Groundwater Investigation

Groundwater investigations conducted during the RI were completed by a combination of 1) soil borings with groundwater samples collected at the water table, 2) hydraulic probe borings with groundwater samples collected at the water table, and 3) groundwater quality borings with groundwater samples collected from the water table to their total depth. These groundwater samples were analyzed using the field GC to refine each investigation as it proceeded. Groundwater sampling from the monitoring wells was also conducted during each phase of investigation and quarterly rounds of groundwater sampling are conducted, to date, for the ISCA.

- During Phase I, groundwater quality borings were conducted on the Beloit Corporation Property, in the subdivision, and at Rockton Excavating. One soil boring (SB21) was completed to the water table and a water sample was collected and screened using the field GC. Round 1 groundwater sampling was completed following installation of all wells. Additionally, private wells in the subdivision were sampled. Results of the Phase I groundwater investigation activities were used to determine investigative locations for Phase II.

- During Phase II, soil gas samples were collected and screened using the field GC. Based on the results from the soil gas investigation, soil borings were conducted to further evaluate or eliminate potential sources. Based on the results of the screening of both soil and groundwater, additional borings were conducted to further evaluate or eliminate potential source areas. Following completion of the soil boring investigation, groundwater quality borings were conducted at locations to determine the extent of VOC distribution in groundwater. Additionally, data was collected on the historic use of Beloit Corporation production well W441E. Round 2 groundwater sampling was completed following the installation of additional monitoring wells. Further sampling of the private wells in the subdivision was also conducted by the IEPA. Results from the Phase II groundwater investigation activities were used to determine migration pathway investigative locations for Phase III.

- During Phase III, hydraulic probes and a groundwater quality boring were conducted in the wetlands located to the west of the erection bay to determine if VOCs were migrating from the erection bay area toward the wetlands and Rock River. VOCs were not found to be migrating to the wetlands based on this sampling. Groundwater quality borings were also completed in the subdivision and south of the site to determine the horizontal and vertical extent of VOCs in groundwater. Rounds 3 and 4 groundwater sampling was completed following installation of monitoring wells. Results from Phase III groundwater investigation activities were used to determine areas of investigation for Phase IV.

- During Phase IV nine soil borings and one groundwater quality boring were conducted in the vicinity of Soterion to determine if a source to the deep TCE existed. One soil boring was conducted upgradient of 1102 Blackhawk Blvd. to determine if VOCs detected in the private well were migrating from an upgradient source. One groundwater quality boring was conducted in the central portion of the Beloit Corporation property to determine if geologic anomalies could have allowed vertical migration of the deep TCE. Round 5 groundwater sampling was completed following installation of monitoring wells. Additionally, an evaluation was completed to determine if the ISCA was having an effect on groundwater in the southern portion of the Blackhawk Acres subdivision.

2.1.10 Human Population Survey

The population of the area is based on the Village of Rockton census figures and the number of homes within the Blackhawk Acres subdivision. The current figures for population of Rockton is approximately 4,735. The Village conducted a new census in December 1996. There are approximately 70 homes in the Blackhawk Acres Subdivision.

2.1.11 Ecological Investigation

Refer to Section 7 of this BlRA (i.e., the Screening Level Ecological Risk Assessment).

2.2 RI REPORTS

The following reports were completed during the RI:

- Following completion of the Phase I field investigation, Technical Memorandum 1 was prepared by Warzyn (Warzyn, 1993). The technical memorandum was submitted as final in July 1993. The technical memorandum included information on the site including setting, history, regional information, a summary of work performed, results, and site interpretation.

- Following completion of the Phase II field investigation, Technical Memorandum 2 was prepared by Montgomery Watson (Montgomery Watson, 1995). The technical memorandum was submitted as final in May 1995. The technical memorandum included a summary of investigation data and results. Limited interpretation of results was included in Technical Memorandum 2. The interpretations were based on the methods of the investigation which used real-time data analysis to determine successive data collection activities.

- A Removal Action Design Report (Montgomery Watson 1996) was completed to summarize the operation and monitoring of the ISCA.

- A Construction Observation Report (Montgomery Watson 1996b) was prepared to document the construction of the ISCA to CERCLA standards.

- Following completion of the Phase III field investigations Technical Memorandum 3 was prepared by Montgomery Watson (Montgomery Watson, 1997). The technical memorandum was submitted as final in February 1997. The technical memorandum included a summary of investigation data and results, without interpretation.

- Following completion of Phase IV, Technical Memorandum 4 was prepared by Montgomery Watson (Montgomery Watson, 1998). The technical memorandum was submitted as final in May 1998. The technical memorandum included a summary of investigation data and results, without interpretation.

- As required by the Removal Action Design Report, bimonthly reports were completed from July 1996 through September/October 1997. These reports began being prepared on a quarterly basis following the September/October 1997 report.

2.3 SUMMARY OF FINDINGS

In summary, the four phases of investigation conducted during the Remedial Investigation have accomplished their stated objectives of:

- Determining the nature and extent of contamination

- Identifying source areas requiring remedial action

- Providing information for the BlRA

- Providing information for the evaluation of remedial alternatives in the FS

2.3.1 Extent of VOCs

This section describes the extent of VOCs in soils and groundwater. Other constituents were detected in isolated areas, with no indication of significant migration. The discussion of the presence of these other constituents and their extent are described in Section 4.2 of this report.

2.3.1.1 Soils. The extent of VOCs in surface soils, soils, and sediments has been sufficiently defined for completion of a BlRA and FS. The extent of VOCs is discussed in Sections 4.3.1 of the RI report (Montgomery Watson 1999). The extent of VOCs in soils where determined by the following observations:

- The highest concentration of PCE detected in soils occurs directly above the zone of highest PCE groundwater concentrations, near the erection bay on the BCP. No TCE or significant concentrations of other VOCs were detected at the BCP. Therefore, the release appears to have contained PCE only, with no TCE.

- The residual PCE concentrations within the unsaturated zone at the erection bay are very low. Grain size analyses show a sand and gravel content typically greater than 90% to 95%. These soils are very coarse with little moisture retention and VOC attenuation capacity. Therefore, only low concentrations of VOCs are retained in these soils.

- The higher PCE concentrations detected in the deeper finer grained soils at or near the water table at the point of release were greater than in the overlying coarse soils. These soils are finer, silty sand soils, with a much greater fines content, typically greater than 30% silts and clays, compared to less than 5% to 10% in the overlying soils. These finer grained soils have a higher moisture retention capacity and greater attenuation capacity than the overlying coarse grained soils.

- There were no other residual VOCs detected in soils from soil gas, surface soil or sediment sampling during the RI which would constitute a source of VOCs to groundwater.

2.3.1.2 Groundwater. The extent of VOCs in groundwater has been sufficiently determined for completion of the BlRA and FS. The extent of VOCs in groundwater is discussed in Sections 4.3.2.1 and Sections 4.3.2.2 of the RI report (Montgomery Watson 1999).

The distribution of total chlorinated VOCs in groundwater is based primarily on groundwater sampling conducted in the Phase III investigation (November 1995 and July 1996). It is supplemented with results from the ISCA sampling conducted since system start-up in July 1992 through April 1998, downgradient private well results from IEPA sampling in May 1998, and private well results from IEPA sampling in August 1997.

The extent of total VOCs in groundwater are characterized by the following observations:

- The distribution of total VOCs present in groundwater on the Beloit Corporation property, south of the property and within Blackhawk Acres subdivision is shown on Drawing A6 for Nov. 1995/July 1996 and on Drawing A7 for April 1998. These maps do not discriminate between the presence of PCE, TCE, and other VOCs or the source(s) of these VOCs.

- In general, the horizontal distribution of VOCs follows groundwater flow to the south with final discharge of the VOCs to the Rock River. This strong correlation between the measured groundwater flow direction and the extent of VOCs south

of the NPL site, shows that this hydrogeologic interpretation, and ultimate fate of the VOCs in groundwater is accurate.

- The vertical extent of chlorinated VOCs is limited to the sand and gravel overlying the clay present at a depth of 56 ft to 90 ft on the NPL Site. South of the NPL Site, this clay is shown to pinch out, so that the sand and gravel extends to the top of the dolomite aquifer. The vertical extent of VOCs, south of the NPL Site, are limited to the sand and gravel above the bedrock.

- The Village of Rockton's well No. 5 is located approximately 2,200 ft to the east of the centerline of this plume and is screened within the shallow aquifer. The groundwater flow between wells W48C and W49C is not toward the village well. This is supported by the lack of VOCs detected in well W49C and village well No. 5. These observations demonstrate that groundwater flow from the NPL Site is not captured by village Well No. 5. This is further supported by a report by the IEPA, Division of Public Water Supplies which indicates groundwater to village Well No. 5 originates from the northeast of the well.

The extent of individual VOCs in groundwater where determined by the following observations:

- The VOCs present on the Beloit Corporation property are in the upper portion of the shallow aquifer and consist primarily of PCE, with small percentages of TCE, 1,2-DCE, as degradation products of PCE, and low concentrations of 1,1,1-TCA. The source of these VOCs have been shown by soil sampling, to be from the erection bay area (near well W23). This plume was shown to extend to the southwest through wells W38 and W03R and was detected in the field screening samples at W43C, and potentially at W47C and W48C. The western, lateral extent of this PCE plume is delineated by wells W42, W06, and G104. The PCE plume is shown to extend to the east, to well W41 and is not present to the east at well nest W13/W14, and is not present to the south at well nests W22/W22B/W22C or G103S/G103D/W18 concluding the eastern extent of this PCE plume is slightly east of well W41 and west of well nests W13/W14, W22/W22B/W22C, and G103S/G103D/W18.

- A VOC plume consisting primarily of TCE, with minor concentrations of 1,1,1-TCA and 1,1-DCE is present on and south of the Beloit Corporation property in the deeper portion of the shallow aquifer. This plume is present southeast of Beloit Corporation property (well W18) on the south end of the property (W26C) and downgradient (W43C, W47C, and W48C). This TCE plume does not contain detectable PCE nor 1,2-DCE indicating that the plume is likely from a release of TCE, not the break down of PCE. Additionally, the TCE plume is located in the deeper portion of the shallow aquifer while the PCE plume on Beloit Corporation property is located in the upper portion of the shallow aquifer. The furthest upgradient wells containing this group of compounds are wells W18 and W21B.

The TCE plume is shown to extend into the village through monitoring wells W43C, W47C, and potentially through well W48C (the presence of 1 to 2 ug/L of PCE at well W48C may suggest the plume at this well is associated with the PCE plume). Results of sampling conducted by IEPA of private wells indicate the well at 630 Blackhawk Blvd. may be located on the plume fringe (5 ug/L TCE detected), either horizontally or vertically. Private wells located downgradient of well W48C did not detect any VOCs, indicating the TCE plume has not migrated far enough downgradient to affect these wells or that the private wells are deeper or shallower than the plume. It is expected that the groundwater, and low concentrations from the TCE plume, is currently or will eventually discharge into the Rock River. The eastern lateral extent is shown by no or very low detects of TCE at wells W44C, the private wells at 910, 914, and 918 Watts Ave, W50C, and W49C. The western extent of TCE is limited by the presence of the Rock River and hydroelectric plant raceway to the west with a higher head than the groundwater which recharges the aquifer in this area, limiting the potential for flow to the west and delineating the TCE plume on the west. The source to this TCE plume has not been determined, but is shown to have probably dissipated, leaving no evidence of the source.

Field screening of groundwater while drilling wells W43C and W47C (and very low concentrations at well W48C-1.6 ug/L and 1.3 ug/L) showed the presence of 1,1,1-TCA, PCE and TCE at a shallower depth than the deep TCE plume. This plume, at the shallower depth, may be related to the VOCs located on the Beloit Corporation property.

- The VOCs in the southern Blackhawk Acres subdivision wells (i.e., 910 Watts, 914 Watts and 918 Watts) is characterized by PCE and 1,1,1-TCA. The extent of VOCs in this area is delineated by the surrounding private wells, including private wells to the north on Watts Ave (1004 Watts) where no PCE was detected, to the east (905 Watts and 909 Watts) where low or no PCE was detected and monitoring well W44C and well nest G103S/G103D/W18 to the east and west of these private wells. The source of this PCE is unknown.

- The VOCs present in the northern portion of the Blackhawk Acres subdivision was historically limited to chloroform, centered at 1310 Blackhawk Ave. However, there was no chloroform detected during the August 1997 sampling and the source is believed to have dissipated.

- An isolated occurrence of TCE and low concentrations of 1,1,1-TCA and 1,1-DCA was detected at 1102 Blackhawk Ave. The extent of these VOCs is limited to this private well at this time. Previously, a downgradient private well (1012 Blackhawk) had lower concentrations of the same compounds and TCE was not detected in groundwater directly upgradient of 1102 Blackhawk. The source of the TCE is believed to be very local and the declining concentrations show the plume is dissipating.

No residual source of TCE or other VOCs was identified in any of the other areas of potential concern based on the collection and analysis (both field screening and laboratory analysis) of soil gas, soil, and groundwater throughout the RI.

2.3.2 ISCA

The objectives of the ISCA were developed based on the hydrogeologic conditions and water quality on the Beloit Corporation property. The objectives include:

- Limit the potential for migration of VOCs in groundwater on the Beloit Corporation property through installation of a groundwater containment system.
- Implement source removal of VOCs from groundwater at an identified source area (in the vicinity of the erection bay and well W23).
- Install and operate an appropriate treatment system for groundwater generated by the containment system that will limit unacceptable discharges or emissions.
- Dispose of waste streams from the EE/CA recommended action, in accordance with a National Pollutant Discharge Elimination System (NPDES) permit.

Observations from the performance of the ISCA include:

- The NPDES permit levels have been met since startup. Influent VOC concentrations have been generally declining and monitoring wells near the extraction wells have also shown generally declining VOC concentrations.
- The system is pumping typically at an average rate of approximately 210 gpm and continues to achieve discharge limits in accordance with the NPDES permit.
- A detailed evaluation of the ISCA proved a direct hydraulic connection between extraction well EW04 and wells located in the southern portion of Blackhawk Acres subdivision. The range of influence of extraction well EW04 is shown to extend beyond 680 ft (well W18) into the Blackhawk Acres subdivision, but was not detected during the two week test as far as 900 ft (well W44C). The lack of response at well W44C, out at 900 ft, may be due to poor hydraulic connection or that the test may not have been run for a long enough time.
- A water table map and potentiometric map (Drawings F12 and F13) illustrate that the extraction system captures groundwater on the Beloit Corporation property and a portion of the subdivision to the east.

This indicates that the ISCA has effectively captured groundwater on the Beloit Corporation property and therefore, VOCs are not migrating off the Beloit Corporation property.

2.4 CONCLUSIONS

The overall objectives of the RI were to determine the nature and extent of contamination sufficiently to identify sources of contamination, complete the BlRA, and FS to ultimately select a remedy for the site. These objectives were satisfied through the four phases of the RI investigation.

A source of VOCs to the groundwater was identified at the erection bay and has been characterized. Other source areas that, based on the RI, appear to have been present, are shown to have dissipated, and are not acting as continuing sources of contamination to groundwater. The extent of contamination within the groundwater has been characterized sufficiently to determine the potential risks associated with the groundwater and to select a remedy.

The ISCA is currently meeting the Interim Source Control objectives of capturing VOCs on the Beloit Corporation property and removing VOCs from the extracted groundwater. The treatment system is meeting the NPDES permit limits for discharge to the Rock River. Based on the ISCA evaluation, the groundwater extraction system captures groundwater on Beloit Corporation property and in at least a portion of the Blackhawk Acres subdivision. Future operation is expected to continue to meet these objectives.

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3.0 IDENTIFICATION OF CHEMICALS OF POTENTIAL CONCERN

This section of the BlRA discusses the selection of chemicals of potential concern (COPCs) for detailed evaluation. The purpose of selecting chemicals of potential concern for the risk assessment is to identify those chemicals associated with the NPL Site which are most likely to be of concern to human health.

3.1 DATA USED FOR RISK ASSESSMENT

This BlRA relied on the findings of the RI investigation to determine risks associated with soil, groundwater, and Rock River surface water and sediment on or near the NPL Site. Prior to the selection of chemicals of potential concern, the relevant RI data were grouped and summarized. The RI at the NPL Site was performed in four phases. A work plan was prepared for each phase of work and identifies the field sampling activities. The samples collected were analyzed in accordance with the IEPA approved Quality Assurance Project Plan (QAPP) (Warzyn 1992). The Phase I RI was performed in the summer of 1992 and included collection of samples from soil borings, groundwater monitoring wells, and private water supply wells. The Phase II RI was performed in the summer of 1994 and included sampling and analysis of surface soil, additional soil borings and groundwater monitoring wells. The Phase III RI was performed in the fall of 1995 and included additional groundwater sampling, and the collection and analysis of surface water and sediment from the Rock River. Private wells were sampled and analyzed, during Phase II (Summer, 1994) and during the Interim Source Control Action (July 1996) by the Illinois Department of Public Health. The Phase IV RI included additional groundwater sampling to evaluate potential sources of VOCs in the eastern and southern portions of Blackhawk Acres Subdivision.

Data summarization and grouping was performed using procedures in accordance with U.S. EPA guidance (1989a, b). These summary procedures are described below:

- Only RI data collected, analyzed, and validated according to the U.S. EPA's Contract Laboratory Program procedures and the quality control procedures developed for the RI as presented in the QAPP (Warzyn 1992) were used as the basis of the BlRA, and in the selection of chemicals of potential concern for this assessment. Appendix F provides a summary of the data that were considered unusable and the specific reasons why the data was considered unusable. Very little of the data was considered unusable for purposes of the risk assessment.

- The sample quantitation limits for analyte data were compared to Region III Risk Based Concentrations (RBCs) to evaluate whether there was uncertainty associated with whether particular compounds could have gone undetected even though they may have been present at concentrations that could pose a health

concern. The RBCs represent conservative generic risk based concentrations, and therefore are a conservative benchmark to compare to for screening purposes.

- The NPL site RI data were divided into groups which describe environmental conditions relevant to the BlRA (e.g., surface water, groundwater). Grouping of the data allows for the characterization of different locations within an investigated area. Grouping data also helps in determining exposure point concentrations for target populations. The data groups used in the BlRA are described by environmental medium in sections 6.2.3 through 6.2.5.

3.2 CRITERIA FOR SELECTING CHEMICALS OF POTENTIAL CONCERN

The selection of chemicals of potential concern for the NPL Site also followed procedures based on U.S. EPA guidance (1989a). The purpose of selecting chemicals of potential concern is to eliminate from the risk assessment: (1) those chemicals that are associated with sampling or laboratory artifacts; (2) those chemicals existing at or below naturally occurring background (as presented by the Tiered Approach to Corrective Action Objectives (TACO) Tier I background concentration levels for counties outside metropolitan areas (IEPA 1997)); and (3) those chemicals that are essential human nutrients and unlikely to pose risks to human health. In this document, chemicals of potential concern have been selected based on an analysis of the summarized data and a very conservative protocol (described below).

It is important to recognize that the selection of a chemical of potential concern does not necessarily indicate that it poses a potential risk to human health. The selection of a chemical only indicates that there is a need to evaluate that chemical in the BlRA to determine if its concentrations detected represent potential health risks. The approach used to select chemicals of potential concern was conservative. For example, no chemicals were eliminated as chemicals of potential concern based on a comparison to background concentrations.

The following methodology was used in selecting chemicals of potential concern from the summarized data:

- NPL Site data were compared to available blank (laboratory, field, and trip) data as recommended in U.S. EPA guidance (1989a). If the maximum detected concentration of a common laboratory contaminant (acetone, 2-butanone, methylene chloride, toluene, and the phthalate esters) in a site sample grouping was less than 10 times the maximum concentration in the blanks, the chemical was not selected in that grouping for evaluation in the risk assessment. For those organic or inorganic chemicals that are not considered by U.S. EPA to be common laboratory contaminants, the chemical was not selected in that grouping for evaluation in the risk assessment if the maximum detected concentration was less than 5 times the maximum detected concentration in the blanks. The majority

of the RI data was unaffected and considered useable for purposes of the BlRA. Some sample results (primarily affecting water samples) were considered unusable because of bis(2-ethylhexyl)phthalate, acetone, chlorobenzene, chloromethane, 2-butanone, toluene, or methylene chloride in field or laboratory blanks. Appendix F provides a summary of the data that were eliminated because of blank contamination.

- Based on U.S. EPA guidance (1989a), chemicals that are essential human nutrients, and toxic only at very high doses, were not considered for evaluation. These chemicals include calcium, iron, magnesium, potassium, and sodium. Each of these chemicals lacks U.S. EPA-approved toxicity criteria except for iron.

Prior to selecting chemicals of potential concern, the data was segregated by medium, and area. The segregation took place so that those areas that meet the deminimus risk criteria (i.e., hazard quotient less than (<) 1 or lifetime excess cancer risk $<1x10^{-6}$) could be eliminated as No Further Action (NFA) areas. The data were segregated into groundwater monitoring wells, private wells, soils, and sediment data. The soils data were further segregated by specific areas on the Beloit Corporation property (e.g., storage yard area, fibrous sludge spreading area, etc.), and other properties on the NPL Site (e.g., Soterion). The following sections describe the data groupings for this BlRA and the selection of chemicals of potential concern within each of these sampling groups. Refer to Table 3-1 for a summary of the chemicals of potential concern by medium.

3.3 SELECTION OF CHEMICALS OF POTENTIAL CONCERN IN SOIL

During the Phase I and Phase II soil investigations, a number of soil boring samples were collected. During the Phase II investigation surficial soil samples were also collected. An analysis and explanation of the quality of the data collected during the RI by Beloit Corporation and subsequently used in this BlRA is given in Appendix F. Based on the validation of the chemical data, the soil database was of sufficient quality to use in the BlRA. The few samples where results were not considered usable because of blank contamination or other analytical problems are summarized in Appendix F. In addition sufficient numbers of duplicate samples were collected for quality control purposes, and the duplicate results were comparable to one another.

An overall summary of the surface soil and subsurface soil data are provided in Tables 3-2 and 3-3, respectively. Within these tables the analytical data are summarized, including minimum and maximum analyte concentration, minimum and maximum sample quantitation limit (SQL) for samples where the analyte was not detected, frequency of detection, and comparison to the Region III risk based concentration (RBC). The information in these tables was used to evaluate the SQLs for the analytes to determine in part the data was of sufficient quality for risk analysis. It should be noted that samples with compounds that were detected below detection limits (ND) are identified with the

appropriate data qualifiers and summarized in the complete data summaries given in Appendix G of the RI report (Montgomery Watson 1999).

In review of the surface soil data, there were seven analytes that had SQLs which were elevated above an RBC (i.e., either residential or industrial), indicating that the SQLs were not always sufficient to eliminate the possibility that the compounds were present below the SQL at a concentration that could be of a potential health concern. However, five of the seven compounds were not detected in any sample, and their minimum SQLs were less than the RBC. In addition, these compounds are unlikely to be detected at the NPL site based on the history of chemical use. The two compounds which were detected and had SQLs that exceeded their RBCs were benzo(a)pyrene and dibenz(a,h)anthracene. Each of these compounds had minimum SQLs that were greater than their RBCs; however, the laboratory reported concentrations were estimated and were below the SQLs and below the RBCs. Based on this analysis of the SQLs, the surface soil analytical data is considered sufficient for risk analysis.

Within subsurface soils, the minimum SQL for three analytes were above their residential RBC, but none had minimum SQLs above the industrial RBCs. There were sixteen analytes detected in the subsurface soils samples that had maximum SQLs which were elevated above their residential RBC's, but only two compounds had SQLs that exceeded the industrial RBCs. These two compounds are organic compounds that were not detected in any media, and would not be anticipated to be detected on -site. Considering this analysis the subsurface soil data SQLs appear sufficient for use in the risk assessment, since the soils were collected in areas of industrial land use.

After the initial assessment of the data, the soils data were segregated by areas on and off the Beloit Corporation property. The data were segregated into six areas on the Beloit property including:

- Beloit Corporation Plant (BCP)
- Foundry Sand Disposal Area (FSDA)
- Former Fiber Sludge Spreading Area (FSSA)
- Gravel Pit (GP)
- Storage Yard Area (SYA)
- Waste Water Treatment Plant (WWTP)

and other areas not within the Beloit Corporation property, but on the NPL Site, including:

- Soterion Property

- Rockton Excavating

It should be noted that soil data at the Soterion and Rockton Excavating properties were collected solely for purposes of delineating the potential source of impacts to groundwater on the NPL Site. For this reason at each of these locations only limited sampling occurred (i.e., two or less soil samples). Therefore, no risk assessment was performed for these properties.

No data on chemicals on the Taylor, Inc. or Safe-T-Way properties were obtained during the RI. Therefore, no assessment of these properties are made.

Refer to Tables A-1 and A-2 in Appendix A for a summary of the parameters analyzed and detected in the soil samples during Phase I and Phase II on, and off the Beloit Corporation property, respectively. Refer to Drawing F15 for the locations of the surface and subsurface sample locations.

Within soil samples, low concentrations (i.e., < 0.5 mg/kg) of volatile organic compounds (VOCs) were detected. In addition, a number of semi-volatile organic compounds (SVOCs) were detected in select soil samples. The majority of the SVOCs detected were polycyclic aromatic hydrocarbons (PAHs). Low concentrations (i.e., 0.5 mg/kg) of polychlorinated biphenyls (PCBs) were detected on the Beloit Corporation property, as were some low concentrations of chlorinated organopesticides. A number of metals were detected in soils on the NPL Site.

3.4 SELECTION OF CHEMICALS OF POTENTIAL CONCERN IN GROUNDWATER

Groundwater samples were collected from monitoring wells and submitted for laboratory analyses during all four phases of the RI. During Phase I of the RI, fifty-six (56) private wells were sampled and analyzed for VOCs, and SVOCs. During Phase II and during the remedial action, the Illinois Department of Public Health (IDPH) collected water samples from private wells that showed detectable concentrations of VOCs during the Phase I investigation. Refer to Section 2 for a more detailed summary of the groundwater monitoring program. Refer to Drawing F5 for a summary of the monitoring well and private well locations. An analysis and explanation of the quality of the data collected during the RI by Beloit Corporation and subsequently used in this BlRA is given in Appendix F. Based on the validation of the chemical data, the groundwater database was of sufficient quality to use in the BlRA. The few samples where results were not considered usable because of blank contamination or other analytical problems are summarized in Appendix F. In addition sufficient numbers of duplicate samples were collected for quality control purposes, and the duplicate results were comparable to one another. Refer to Appendix F for a summary of the data qualifiers and the overall quality of the data collected during all four phases of the RI period.

An overall summary of the groundwater and private well data are provided in Tables 3-4 and 3-5, respectively. Within these tables the analytical data are summarized, including minimum and maximum analyte concentration, minimum and maximum sample quantitation limit (SQL) for samples where the analyte was not detected, frequency of detection, and comparison to the Region III risk based concentration (RBC). The information in these tables was used to evaluate the SQLs for the analytes to determine if the data was of sufficient quality for risk analysis. It should be noted that samples with compounds that were detected below detection limits (ND) are identified with the appropriate data qualifiers and summarized in the complete data summaries given in Appendix G of the RI report (Montgomery Watson 1999).

In review of the groundwater data, there were many (i.e., greater than 50) analytes that had SQLs which were elevated above a tap water RBC, indicating that the SQLs were not always sufficient to eliminate the possibility that the compounds were present below the SQL at a concentration that could be of a potential health concern. The SQLs were generally elevated above the RBCs when concentrations of other chemicals which were detected were present in the sample. When concentrations of detected chemicals were less, the SQLs were lower for nondetected chemicals. The groundwater monitoring data is used in the RI and BlRA to describe the extent of the chemical plumes beneath the NPL site, and is used for quantitation of risks for information purposes only. There is no intention to have wells placed in the shallow aquifer on the Beloit Corporation property in the future, since the area is served by deep wells from an aquifer unaffected by the shallow chemically impacted groundwater. However, in assessing the risks from the ingestion of groundwater on the Beloit Corporation property, monitoring well data from the wells located on the property is considered sufficient to assess the risks associated with a hypothetical drinking water scenario. Risk estimates are developed based on private well groundwater monitoring results. The groundwater monitoring well data is considered sufficient to estimate the general limits of groundwater plume delineation.

Within groundwater samples collected from private wells, the minimum SQL for forty analytes were above their tap water RBC indicating that the SQLs were not always sufficient to eliminate the possibility that the compounds were present below the SQL at a concentration that might be of a potential health concern. However, only four of the forty compounds were detected in any groundwater sample, indicating there is a low probability that these compounds would be present. The SQLs were as low as practicable, based on the analytical methods currently available. For this reason, this uncertainty can not be eliminated, but will be discussed in the uncertainty section of this BlRA.

As noted in Section 2.0 of this Report, the distribution of the VOCs in groundwater appear to have been a number of potential sources. For this reason, the monitoring and private well results were broken down into five subgroups to represent areas of different VOCs in groundwater. These areas include:

- PCE Plume - Central Beloit Corporation Property Wells

- TCE Plume - Southern Wells
- Southern Blackhawk Acres Subdivision Wells
- Northern Blackhawk Acres Subdivision Wells
- Eastern Blackhawk Acres Subdivision Wells

The following discusses the chemical groups (e.g., VOCs, SVOCs, etc.) detected in general within monitoring wells and private wells, irrespective of their distribution or potential source. Rather, a determination is made whether the chemical group is of potential concern. After this determination is made a more detailed discussion of the distribution of the chemicals of potential concern is made.

3.4.1 Monitoring Well Results

During the several groundwater sampling events, VOCs were detected in a number of monitoring wells (refer to Table A-3 in Appendix A). The primary VOCs detected were halogenated alkenes (PCE, and TCE) and alkanes (1,1,1,-TCA, 1,1-DCA). Groundwater monitoring wells samples were also analyzed for SVOCs, pesticides, PCBs, and dissolved metals on at least one occasion. During subsequent phases of sampling, parameters were only analyzed for if they were detected during the first sampling round. During Phase 1, very few (i.e. four) SVOCs were detected in one or two wells at low concentrations (i.e., 1 or 2 ug/L). No PCBs were detected in the monitoring wells, and only two pesticides were detected at trace concentrations (i.e., < 1 ug/L).

The two pesticides were heptachlor and endrin aldehyde. It should be noted that while the one detection of heptachlor was below the MCL and Illinois groundwater quality standard of 0.4 ug/L, the detection of 0.16 ug/L and the sample quantitation limits for all of the groundwater samples were above the U.S. EPA Region III risk-based concentration for tap water of 0.0023 ug/L (Table 3-4) (U.S. EPA Region III, 1998). During the second phase of sampling, none of the SVOCs or pesticides detected during Phase 1 were detected (refer to Appendix B, Table 3-9). SVOCs and pesticides were not considered chemical groups of potential concern in groundwater because they were not detected in subsequent sampling rounds, and there are no known sources of these compounds. However, the potential risks associated with heptachlor are addressed in Section 8.0, Discussion of Uncertainties.

Also, during the Phase 1 investigation, a number of metals were analyzed for and detected in groundwater. However, all the detected metals were at concentrations below their Federal Drinking Water Standards (i.e., Maximum Contaminant Level; MCL) with the exception of cadmium and zinc. During phase 1, these two metals were detected at (cadmium) or above (zinc) their respective MCL in a single shallow and intermediate monitoring well. During the second phase of sampling, concentrations of these metals were detected at concentrations below their MCLs. For this reason, metals were not considered a chemical group of concern.

Based on this assessment, VOCs were the only chemical group of potential concern based on the monitoring well results.

3.4.2 Private Well Results

Groundwater samples collected from private wells were analyzed for VOCs, and SVOCs during the first round of sampling (refer to Table 4-18 from the RI in Appendix A of this Report). Chlorinated VOCs were detected in several of the private wells. However, only a single SVOC (i.e., 1,4-dichlorobenzene) was detected at a very low concentration (0.6 ug/L). No other SVOC was detected in the groundwater collected from the private wells. For this reason, like the monitoring wells, the only chemical group of potential concern in the private wells was considered to be VOCs.

3.4.3 Summary of Extent of VOCs in Groundwater

The following subsections summarize the distribution of the VOCs by the five well groupings that were described earlier. The distribution of VOCs is described in greater detail in the RI report, Section 4.2.4 (Montgomery Watson 1999). Refer to Section 4.3.2.2 of the RI report (Montgomery Watson 1999) for a more detailed discussion of the distribution of VOCs by well grouping.

3.4.3.1 PCE Plume - Central Beloit Corporation Property Wells. The PCE released in the vicinity of the Beloit Corporation erection bay is present in the groundwater on the Beloit Corporation property and has been shown by six years of groundwater monitoring data to be moving primarily to the southwest on the Beloit Corporation property. 1,1,1-TCA, TCE, 1,1-DCE and cis-1,2-DCE are also present in this plume and migrating to the southwest in the upper portion of the shallow aquifer on the Beloit Corporation property. This plume was shown to extend to the southwest through wells W38 and W03R and was detected in the field screening samples at W43C, and potentially at W47C and W48C. Results of the ISCA sampling indicate that the downgradient limit of this plume, contiguous with the source area, is shown to extend to extraction well EW03. This plume is being contained through groundwater capture by the ISCA pump and treat system.

3.4.3.2 TCE Plume - Southern Wells. A plume of TCE and 1,1,1-TCA is shown to be present in the southern wells in the deeper portion of the shallow aquifer. Investigative activities were undertaken during the RI in an attempt to identify the source of the TCE plume in the southern wells. However, the RI data indicates no residual TCE exists in the upper portion of the shallow aquifer or in soils above the water table on or off the Beloit Corporation property. The former source of the TCE plume in the southern wells remains unknown. Based on the RI data, the only remaining evidence of a release of TCE is the plume migrating downgradient.

The upgradient head of the TCE plume is present at well W18, east of the Beloit Corporation property. This TCE plume extends through well W26C and extends to the

south, following groundwater flow toward the Rock River south of the village. There were no VOCs detected in private water supply wells located along the Rock River south of the village during sampling conducted by the IEPA in May 1998. These VOCs are also shown to be outside the capture zone of the village well No. 5.

Field screening (as distinguished from lab analyses) of groundwater while drilling wells W43C and W47C showed the presence of 1,1,1-TCA, PCE and TCE at a shallower depth than the deep TCE plume. This plume at the shallower depth may be related to the VOCs located on the Beloit Corporation property.

3.4.3.3 Southern Blackhawk Acres Subdivision Wells. The extent of PCE and 1,1,1-TCA at the private wells in the southern portion of the Blackhawk Acres subdivision is shown to be limited to primarily 910, 914 and 918 Watts Ave. The source of the VOCs at these private wells is not known. However, decreasing concentrations indicate that the source of PCE and 1,1,1-TCA to these wells is dissipating.

3.4.3.4 Northern Blackhawk Acres Subdivision Wells. The chloroform that was present in the northern portion of the Blackhawk Acres subdivision is shown to be limited primarily to wells south, and in the vicinity of 1310 Blackhawk Ave. The source of the chloroform is shown by the RI data to be from a location in the vicinity of 1310 Blackhawk Ave. Based on recent samples showing no detectable chloroform, it is assumed that the source has dissipated.

3.4.3.5 Eastern Blackhawk Acres Subdivision Wells. The TCE and ancillary VOCs present in the eastern portion of the Blackhawk Acres subdivision is shown to be limited to primarily one residential well (1102 Blackhawk Ave.). The source of these VOCs is shown by the RI data to have been in the vicinity of 1102 Blackhawk Ave. Based on decreasing TCE concentrations, it is assumed that the source is dissipating. TCE was recently detected at well G108D, downgradient of well 1102 Blackhawk. The TCE at G108D may represent a plume of TCE migrating from 1102 Blackhawk Avenue.

3.5 SELECTION OF CHEMICALS OF POTENTIAL CONCERN IN RIVER SEDIMENT

Sediment samples were collected from the Rock River during the Phase III investigation. An analysis and explanation of the quality of the data collected during the RI by Beloit Corporation and subsequently used in this BlRA is given in Appendix F. Based on the validation of the chemical data, the sediment database was all of sufficient quality to use in the BlRA. In addition sufficient numbers of duplicate samples were collected for quality control purposes, and the duplicate results were comparable to one another. The sediment samples were collected to determine if there were impacts to the Rock River associated with the Beloit Corporation property. The sediment samples were collected at ten locations along the reach of the River adjacent to the NPL Site (refer to Figure F1 in Appendix C). An overall summary of the sediment data are provided in Table 3-7. Within this table the

analytical data are summarized, including minimum and maximum analyte concentration, minimum and maximum sample quantitation limit (SQL) for samples where the analyte was not detected, frequency of detection, and comparison to the Region III risk based concentration (RBC) for soils, since an RBC for sediment is not available. The information in this table was used to evaluate the SQLs for the analytes to determine if the data was of sufficient quality for risk analysis. It should be noted that samples with compounds that were detected below detection limits (ND) are identified with the appropriate data qualifiers and summarized in the complete data summaries given in Appendix G of the RI report (Montgomery Watson 1999).

In review of the sediment data, there were eleven analytes that had SQLs which were elevated above their respective RBC (i.e., either residential or industrial), indicating that the SQLs were not always sufficient to eliminate the possibility that the compounds were present below the SQL at a concentration that could be of a potential health concern. However, nine of the eleven compounds were not detected in any sample, and these compounds are unlikely to be detected at the NPL site based on the history of chemical use. The two compounds which were detected and had SQLs that exceeded their RBC were benzo(a)pyrene and dibenz(a,h)anthracene. Each of these compounds had minimum SQLs that were greater than the RBC, however the laboratory reported concentrations were estimated and were below the SQLs. Based on the analysis of the SQLs, the sediment analytical data is considered sufficient for risk analysis. The following is a summary of the chemicals detected in the sediment samples collected from the Rock River.

The sediment samples were analyzed for TCL organics and TAL inorganics. Refer to Table 7-1 for a summary of the sediment sample analytical results by sample location. Four VOCs were detected sporadically in one or more samples at low concentrations (<0.2 mg/kg). Within the sediment samples, SVOCs were also detected sporadically at four of the ten sediment sample locations. The SVOCs detected were primarily PAHs. The concentrations of PAHs in sediment were less than 1 mg/kg, except at sediment sample location SD07 where concentrations of individual PAHs were as high as 100 mg/kg. As mentioned in Section 4 of the RI Report (Montgomery Watson 1999), the elevated PAH detects at SD07 appear to be an isolated occurrence unrelated to activities on the NPL Site. This is because at other sediment samples (SD04, SD05, SD06, and SD08) collected between the Beloit Corporation Property/NPL Site and SD07 there were no detectable concentrations of PAHs. In addition, SD07 was collected on the west side of a peninsula of bottomland further removed from activities on the Beloit Corporation property and the NPL Site than the areas where samples SD04, SD05, SD06, and SD08 were collected (refer to Figure F1 in the Phase III Technical Memorandum). Also, based on the direction of flow of the River, the area where sample SD07 was collected would be isolated from activities on the Beloit Corporation Property/NPL Site. Other sediment samples collected further upstream on the same side of the peninsula as SD07 had concentrations of PAHs approximately 100 times lower than the concentrations at SD07. For this reason, the concentration of PAHs at location SD07 appear to be an anomaly unrelated to the site, and much more likely associated with dynamic transport of sediment in a river through an industrial and urban area.

A number of metals were also detected in the sediment samples collected from the Rock River. The sediment metal concentrations downstream of the NPL Site were generally higher than the concentration of metals samples upstream of the site. Refer to Section 4 of the RI Report for a more detailed discussion of the distribution of metals in sediments of the Rock River adjacent to the Beloit Corporation property. It should be noted that, the analytes detected in the river sediments will be retained as COPCs, and risks will be assessed regardless of whether these metals are associated with the NPL Site.

3.6 SELECTION OF CHEMICALS OF POTENTIAL CONCERN IN RIVER SURFACE WATER

A single surface water sample (SW01) was collected from the Rock River adjacent to the Beloit Corporation property during the Phase III investigation to verify that organic chemicals in groundwater were not being discharged to the River Adjacent to the Beloit Corporation property. This one sample adjacent to the Beloit Corporation property is considered sufficient to demonstrate that organic chemical impacts based on groundwater discharge to the Rock River in this area have not occurred in light of the fact that several wells and water quality samples have demonstrated that, groundwater discharge to the Rock River adjacent to the Beloit Corporation does not occur. The surface water sample was collected at the same location as sediment sample SD06. The surface water sample was analyzed for organics. No organic compounds were detected.

It should be noted that groundwater is anticipated to discharge to the Rock River where the groundwater plume discharges to the Rock River south of the Village of Rockton. For this reason, VOCs that have been detected in the groundwater monitoring wells downgradient of the NPL Site and are considered COPCs (refer to Table 3-1) were retained as chemicals of potential concern in surface water in this reach of the Rock River.

3.7 SUMMARY OF CHEMICALS OF POTENTIAL CONCERN

Table 3-1 summarizes the COPCs identified for soil, sediment, groundwater from monitoring wells and private well water. The VOCs detected in shallow monitoring wells on the Beloit Corporation property were also retained as COPCs in Rock River surface water at the point of groundwater discharge to the Rock River south of the Village of Rockton. The soil chemicals of potential concern summary have been further segregated into four subgroups. The table lists the chemicals detected during the RI, with the exception of those chemicals not detected in the given media, chemicals removed due to blank contamination (refer to Appendix F), or chemicals removed because they are essential human nutrients (i.e., calcium, iron, magnesium, potassium, and sodium). The data collected during the RI was considered sufficient in terms of quantity and quality to perform the BlRA.

4.0 TOXICITY ASSESSMENT

The general methodology for the classification of health effects and the development of health effects criteria is described in Sections 6.3.1 and 6.3.2. This section provides the analytical framework for the characterization of human health risks in Section 6.5. In Section 6.3.3, the health effects criteria that were used to derive estimates of risk are presented and the toxicity of the chemicals of potential concern is briefly discussed.

4.1 BACKGROUND

The information presented in this section provides a basis for the dose-response assessment carried out in the quantitative risk assessment.

Evaluation of the toxic potential of a chemical involves the examination of available data that relate observed toxic effects to doses. Generally, there are two categories of information that are considered in this part of a quantitative risk assessment:

- Information on the potential acute or chronic non-cancer effects of chemicals, and
- Information on the potential for chemicals to initiate or promote cancers.

A wide variety of factors must be considered in using health effects data in risk assessments. As discussed in the following subsections, there may be a variety of relationships between dose and effects. Also, the fact that some chemicals display thresholds (i.e., there are doses below which the chemical does not cause an effect) must be considered.

4.1.1 Noncarcinogenic Effects

In general, noncarcinogenic (acute or chronic systemic) effects are considered to have threshold values, while carcinogenic effects are considered to not have thresholds. Toxicity studies for the former focus on identifying where this threshold occurs. The threshold can be related to a reference dose (RfD). A chronic RfD is an estimate of a daily exposure level for which people, including sensitive individuals, do not have an appreciable risk of suffering significant adverse health effects. Exposure doses above a RfD could possibly cause health effects.

4.1.2 Carcinogenic Effects

Studies of carcinogenicity tend to focus on identifying the slope of the linear portion of a curve of dose versus response. A plausible upper-bound value of the slope is called the cancer slope factor (CSF) or cancer potency factor (CPF). The product of the CSF and the exposure dose is an estimate of the risk of developing cancer. In accordance with current

scientific policy concerning carcinogens, it is assumed that any dose, no matter how small, has some associated response. This is called a non-threshold effect. In this assessment, the non-threshold effect was applied to all probable carcinogens.

4.2 TOXICOLOGICAL PROPERTIES

The risks associated with exposure to the chemicals detected at this NPL Site are a function of the inherent toxicity (hazard) of each chemical and the exposure dose. This section addresses the inherent toxicological properties of the chemicals. The exposure doses are estimated and discussed in Section 5.0, Human Exposure Assessment, of this report.

A distinction is made between carcinogenic and noncarcinogenic effects, and two general criteria are used to describe these effects: excess lifetime cancer risk (for chemicals which are thought to be potential human carcinogens) and the hazard quotient (HQ) for chemicals that cause noncarcinogenic effects. For potential carcinogens, the current regulatory guidelines (U.S. EPA, 1989a) use an extremely conservative approach in which it is assumed that any level of exposure to a carcinogen could hypothetically cause cancer. This is contrary to the traditional toxicological approach to toxic chemicals, in which finite thresholds are identified, below which toxic effects are not expected to occur. This traditional approach still is applied to noncarcinogenic chemicals. Appendix B summarizes the recognized toxic responses associated with the chemicals at this site.

4.2.1 Carcinogenic Effects

Identification of chemicals as known, probable, or possible human carcinogens is based on a U.S. EPA weight-of-evidence classification scheme in which chemicals are systematically evaluated for their ability to cause cancer in mammalian species and conclusions are reached about the potential to cause cancer in humans. The U.S. EPA classification scheme (U.S. EPA 1989a) contains six classes based on the weight of available evidence, as follows:

- A known human carcinogen;
- B1 probable human carcinogen -- limited evidence in humans;
- B2 probable human carcinogen -- sufficient evidence in animals and inadequate data in humans;
- C possible human carcinogen -- limited evidence in animals;
- D inadequate evidence to classify; and
- E evidence of noncarcinogenicity.

Some chemicals in Class D may have the potential to cause cancer, but adequate data are not currently available to change the classification. In this risk assessment, evaluations of the likelihood of a carcinogenic effect include chemicals in Classes A, B1, B2, and C.

4.2.2 Noncarcinogenic Effects

The assessment of noncarcinogenic effects is complex. There is a broad interaction of time scales (acute, subchronic, and chronic) with varying kinds of effects. In addition, there are various levels of "severity" of effect.

For many noncarcinogenic effects, protective mechanisms must be overcome before the effect is manifested. Therefore, a finite dose (threshold), below which adverse effects will not occur, is believed to exist for noncarcinogens. Noncarcinogenic health effects include birth defects, organ damage, behavioral effects, and many other health impacts. A single chemical might elicit several adverse effects depending on the dose, the exposure route, and the duration of exposure. For a given chemical, the dose that elicits no effect when evaluating the most sensitive response (the adverse effect which occurs at the lowest dose) in the most sensitive species is used to establish an acceptable dose (toxicity value) for noncarcinogenic effects. Acceptable doses that are sanctioned by the U.S. EPA are called verified reference doses (RfDs).

The RfD value is used as a measure of potential chronic heath risks. These values serve as benchmarks for assessing the potential for non-carcinogenic health effects. They represent "threshold" health effects values below which no effects are expected. So that these benchmarks are set low enough, uncertainty in the supporting database is taken into account through the application of uncertainty or safety factors.

The Integrated Risk Information System (IRIS) defines the reference dose as an estimate (uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime. A critical effect refers to the health endpoint upon which the reference dose is based. The uncertainty factor contributes as a divisor to the dose associated with the critical effect, which is usually a no-adverse-effect-level (NOAEL) or a lowest-adverse-effect level (LOAEL). Most uncertainty factors are standardized and include:

- 10-fold factor for extrapolation from animals to humans
- 10-fold factor for variability in the human population
- 10-fold factor for use of a less-than- chronic study
- 1 to 10-fold factor for extrapolation from a LOAEL

The use of ten-fold uncertainty factors is traditional. However, there may be situations where data support the application of smaller uncertainty factors. There is on-going research directed at the use of physiologically based pharmacokinetic modeling for interspecies extrapolation. However, at this time, no specific guidance is provided on the

use of this method for developing better extrapolation (from animal to human, and administered v. absorbed) values for application.

Modifying factors also contribute as divisors to the NOAEL or LOAEL and are usually one. However, in certain instances professional judgment can be applied to use the modifying factor to adjust the reference dose (e.g., epidemiological evidence). Confidence in the reference dose refers to a qualitative judgment with regard to the quality of the critical study, the supporting database, and the dose developed.

4.3 HEALTH EFFECTS CRITERIA FOR THE CHEMICALS OF POTENTIAL CONCERN (COPCs)

Table 4-1 presents chronic oral, inhalation, and dermal toxicity values (slope factors/RfDs) for the chemicals of potential concern selected to be quantitatively evaluated in this assessment. For each chemical of potential concern there was a toxicity value available to characterize the chemicals noncarcinogenic and/or carcinogenic potential. The toxicological properties of select chemicals of potential concern are discussed in Appendix B. In addition, for those carcinogens that had a cancer risk greater than $1x10^{-6}$, additional information concerning the toxicity values are provided in Table 4-2.

Although the U.S. EPA has developed toxicity values for the oral and inhalation routes of exposure, they have not developed toxicity values for the dermal route of exposure. For this reason, a dermal toxicity value was estimated for each chemical of potential concern by adjusting the oral toxicity values. The oral toxicity values are generally based on the level of chemical "administered" to a test animal, rather than the amount of the dose that is "absorbed" into the animals blood stream. However, the oral toxicity values based on an administered dose can be adjusted to account for this absorption factor by incorporating an estimate of the level of oral absorption which is likely to occur. In the present risk assessment, it was necessary to adjust the oral toxicity values based on "administered" doses to an "absorbed" dose basis, because contaminant dose estimates for the dermal exposure route are absorbed doses. The adjusted values are referred to as dermal toxicity values. It was appropriate to adjust each of the oral toxicity values in this way, because they are based on administered doses. This was verified by reviewing the information provided in IRIS, and from USEPA's National Center for Exposure Assessment (NCEA) for provisional toxicity values. The following equations were used to arrive at the dermal toxicity values (U.S. EPA 1989a);

Oral Reference Dose (administered) x Oral Absorption Estimate = Dermal Reference Dose (absorbed)

Oral Slope Factor (administered)/Oral Absorption Estimate = Dermal Slope Factor (absorbed)

The current convention is to use an oral absorption estimate equal to 100 percent for those chemicals that based on literature studies have an oral absorption efficiency of 50 percent or greater. This is due to the fact that the inherent variability in such data is great enough that unless the oral absorption efficiency is less than 50 percent, it is not considered significant enough to make an adjustment to the oral toxicity value. The 100 percent value is also used for compounds where data on oral absorption is not available. For those compounds where the oral absorption efficiency is below 50 percent, then the actual value on absorption efficiency is used in the above equations to estimate the dermal toxicity values. The actual oral absorption estimates used are presented in Table 4-1.

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5.0 HUMAN EXPOSURE ASSESSMENT

The purpose of this section is to describe how the potential human exposures to chemicals of potential concern selected for the NPL Site were calculated. As part of this evaluation, information on the exposure setting and the potentially exposed populations was compiled (Section 5.1). This was followed by an assessment of potential exposure pathways through which populations could be exposed to chemicals detected in media on the NPL Site (Section 5.2). For each pathway selected for quantitative evaluation, the chemical concentrations at the points of exposure were estimated (Section 5.3), followed by a calculation of potential chemical doses (Section 5.4).

5.1 NPL SITE CHARACTERIZATION AND RECEPTOR SELECTION

The NPL Site is located within Rockton Township, in north-central Illinois (Drawing A2). The NPL Site lies in a mixed industrial and residential area approximately 0.5 miles north of the Village of Rockton. The RI/FS boundary, as identified by the IEPA, includes Beloit Corporation property, the neighboring Blackhawk Acres Subdivision, Rockton Excavating, and Soterion (Drawing A2). The NPL Site is bounded on the north by Prairie Hill Road, on the west by the Rock River, on the south by a line projected along a Beloit Corporation access road from Blackhawk Boulevard to the Rock River, and on the east by Blackhawk Boulevard.

The Beloit Corporation manufacturing plant (BCP) is located at 1165 Prairie Hill Road in Rockton, Illinois (refer to Drawing F5). Beloit Corporation is a manufacturer of machines that produce layered paper products from paper pulp. In addition to the manufacturing plant, a research center is located on Beloit Corporation property. The Beloit Corporation Research Center (BCRC) designs and demonstrates papermaking machines. The property upon which the facility is located was farmland prior to purchase by Beloit Corporation in 1957. The facility has its own deep production wells to supply production and drinking water. The facility also has its own on site wastewater treatment plant that discharges to the Rock River.

There are several structures located on Beloit Corporation property as indicated on Drawing F5. Two wastewater treatment ponds and two clarifier tanks are located west of the BCRC. The BCRC (40,000 sq ft) is located in the north-northwest portion of the property. The BCP (230,000 sq ft) is located south-southwest of the BCRC.

Large outdoor storage yard areas (SYA), which hold scrap metal, pipe and miscellaneous equipment are located on the northeast and southwest sides of the BCP (Drawing F5). These storage areas are partially paved with asphalt. Crushed stone covers the remainder of the storage yard areas. Also, asphalt parking lots exist between the BCP and the BCRC, and between the BCP and the railway.

A former foundry sand disposal area (FSDA) is located southwest of the BCP and a former fibrous sludge spreading area (FSSA) is located south of the BCP (Drawing F5). These areas have over time become densely vegetated with grasses. An inactive gravel pit, owned by Beloit Corporation, is located east-northeast of the BCRC. A Company railway and driveway separates the gravel pit from the main Beloit Corporation property.

The BCP is surrounded by a nine foot fence, which is topped with three strands of barbed wire to limit access to the property. A guard is posted to monitor security at the plant 24 hours a day. In addition, a fence of the same construction runs north-south along the railroad corridor. The southern end of the fence line extends west to the Rock River. Although the property is posted with no trespassing signs, trespassing could occur within the bottomlands near the Rock River on the Beloit Corporation property. In addition, there is no fence along the western side of the property that would prevent access to the Beloit Corporation property from the Rock River. Residents living near the NPL Site have been observed on the Beloit Corporation property. In addition, hunting activities have been observed on the property near the River. Between the BCP and the River, the Beloit Corporation property is heavily vegetated (i.e., grassland and woodland). There are no large areas of exposed soils in this area of the site. The only exposed soils occurring on the Beloit Corporation property are in the gravel pit northeast of the BCP.

Blackhawk Acres Subdivision, and the buildings and paved areas at Rockton Excavating, Safe-T-Way, and Soterion make up the eastern portion of the NPL Site (Drawing F5). Four homes in the subdivision have been placed on point of entry water treatment systems, installed, maintained and monitored by the IEPA for treatment of chlorinated VOCs in their raw water. The nearest residents are located directly east of the BCP, across the railroad tracks. To the north of the subdivision is Rockton Excavating, and to the south are Soterion and Taylor Inc. Safe-T-Way is located in the central portion of the subdivision.

All the residences within the Blackhawk Acres subdivision on the NPL Site have private water supply wells and septic systems. The private wells in the subdivision draw water from the shallow sand and gravel aquifer.

Since the mid-1950's, the Village of Rockton residences south of the NPL Site boundary have been using the Village of Rockton municipal water supply, which is not chemically impacted. In 1997, however, the Village of Rockton identified ten addresses with private wells potentially downgradient groundwater containing VOCs (i.e., were not utilizing the municipal water supply). Appendix G of Technical Memorandum 4 (Montgomery Watson 1998) details some of the recent efforts Beloit Corporation and the Village of Rockton has put forth in identifying the ten remaining private wells in the Village. The private well located at 630 North Blackhawk, was found to have water impacted by VOCs, and therefore was hooked-up to the Rockton municipal water supply in 1999, and the private well was abandoned. The other nine residences are currently continuing to use their private wells, which have not been affected, based upon groundwater testing. It is important to note that because no information is available regarding the construction and depth of these

nine wells, it is not possible to predict whether these wells will become impacted as VOCs migrate towards the Rock River.

During the summer of 1996, construction of a new subdivision composed of a few homes began just south of the NPL Site as defined by the IEPA. As part of the subdivision, an on site pond will be constructed from a former gravel pit. These homes are within the Village of Rockton and use the Village of Rockton municipal water system. Recently, a few additional homes have been added to this subdivision adjacent to the Rock River, some of them apparently within the southwestern footprint of the NPL site, as defined by the IEPA. These homes are also served by the Village of Rockton municipal water system.

Based on the measures implemented to treat chemicals detected in the groundwater on the NPL Site, the pump and treatment system that is in operation as a source control measure, and the vegetated conditions at the site, limited chemical exposure is anticipated on or off the NPL Site. However, the persons most likely to contact impacted media on the NPL Site include the few residents living within the IEPA defined NPL Site boundaries. Nearby residents are also most likely to recreate in the Rock River. Residents near the Beloit Corporation property may also on occasion visit the bottomlands near the River owned by Beloit Corporation for recreational purposes. Besides residents, employees, and employees of construction contractors working for the Beloit Corporation would have the potential to be exposed to chemically impacted media on site. Based on NPL Site conditions, the following receptor groups were selected as representative for the site. The receptor groups included:

- Nearby residents (includes trespassers on the Beloit Corporation property)
- Beloit Corporation property employees
- Beloit Corporation property construction workers

Nearby residents are broken into a number of subgroups based on their location within the NPL site (three sub-groups) or outside of the NPL site (one subgroup). This classification is used to better define groundwater exposure potential for the different residential areas. This is explained in more detail within Section 5.2. The following section describes in detail the ways in which these potential receptors may be exposed to media on-site.

5.2 POTENTIAL EXPOSURE PATHWAYS

Based on the Superfund Risk Assessment Guidance (EPA 1989), an exposure pathway describes the course a chemical takes from its location, regardless of source, to the exposed individual. It is defined by four elements:

- A source and mechanism of chemical release to the environment.

- An environmental transport medium (e.g., groundwater, surface water) for the released constituent.

- A point of potential contact with the contaminated medium (referred to as the exposure point).

- An exposure route (e.g., ingestion, inhalation) at the exposure point.

When all four of these elements are present, an exposure pathway is considered "complete". In a risk assessment, only complete exposure pathways are evaluated. In this section, potentially complete human exposure pathways at the NPL Site are identified based on current land use conditions (i.e., both present conditions and hypothetical future conditions), and potential future land use conditions.

Based on current NPL Site land use conditions, three potentially exposed human populations were considered to exist on site. These included employees, construction workers working on the Beloit Corporation property, and residents. It is anticipated that these three populations provide a representative cross section of the populations that may come in contact with contaminated media on the NPL Site under current, as well as future land use conditions. It is considered reasonable to assume that the Beloit Corporation facility property will continue to be industrially used into the future. Furthermore, even if the Beloit Corporation facility property were cleared for potential residential development, due to the Winnebago County Water Supply Code (provided in Appendix A of Technical Memorandum 4) private water supply wells could not be installed. For this reason, additional populations were not selected to assess risk solely under hypothetical alternative future land use scenarios. Rather, the exposure scenarios developed for these three populations were considered the most realistic for both current and the most likely future NPL Site conditions. This is explained further under Section 5.2.2.

5.2.1 Potential Exposure Pathways Under Current Land Use Conditions

For each human population an exposure pathway analysis was conducted. The analysis consisted of determining which exposure pathways were complete for each population. An exposure pathway was considered complete if all four conditions discussed above were satisfied (i.e., source, transport mechanism, exposure point, and exposure route). As discussed above, exposure pathways are in essence the ways in which people are exposed to impacted media.

An exposure pathway analysis was conducted for each potentially exposed population. These included the Beloit Corporation employees, construction workers, and local residential populations. It should be noted that for purposes of the risk assessment, it was assumed that the residential population may also occasionally trespass on the Beloit Corporation property. This is a standard scenario incorporated into risk assessments when unauthorized access to a restricted access area can not be totally eliminated.

The results of the exposure assessments are summarized in the following subsections for residents (including trespassers), employees, and construction workers, respectively. These summaries indicate the exposure medium, source and/or release mechanism, exposure point, potential receptor and route of exposure. These summaries also indicate whether each pathway is potentially complete and so identifies those pathways that are *quantitatively* evaluated in the BlRA. The following subsections discuss for the three identified exposure groups (i.e., residents, employees, and construction workers), all potential exposures by environmental medium (i.e., groundwater, surface water, sediments, soils, air and food). Table 5-4 gives a figurative summary of these pathways.

5.2.1.1 Residents. The following section discusses the potential exposure nearby residents by media (i.e., groundwater, soils, and Rock River surface water and sediment).

5.2.1.1.1 Groundwater - The RI groundwater monitoring analytical data summarized in Section 2 indicates that chlorinated VOCs have been detected in groundwater underlying and downgradient from the NPL Site. Based on the RI data there appears to be five well groupings of chlorinated VOCs impacted groundwater on the NPL Site. The five areas include:

- PCE Plume - Central Beloit Corporation Property Monitoring Wells
- TCE Plume - Southern Wells South of Beloit Corporation Property
- Southern Blackhawk Acres Subdivision Wells
- Northern Blackhawk Acres Subdivision Wells
- Eastern Blackhawk Acres Subdivision Wells

Of these five areas, residents reside in each area except the Central Beloit Corporation Property Monitoring Well area. A summary of the distribution of the chlorinated VOCs by area is provided in Section 3.4.3 of this report, while a more detailed analysis is provided in Section 4.3.2.2 of the RI report (Montgomery Watson 1999). This section describes the potential for residents to be exposed to the CVOCs in groundwater within the four areas where residents reside. A discussion concerning employee and construction worker exposure to groundwater on the Beloit Corporation property is contained in a later portion of this Section.

PCE Plume - Central Beloit Corporation Property Wells

Under current land use conditions, residents do not live on the Beloit Corporation property, and so a discussion of exposure to residents to groundwater is not applicable.

TCE Plume - Southern Wells South of Beloit Corporation Property

Under current land use conditions, no private wells exist that are impacted by the groundwater contamination. In the past, one Village of Rockton residence (630 North Blackhawk) had a private well supply well containing elevated concentrations of TCE south of the NPL Site. At this residence, exposure to TCE impacted groundwater was eliminated by removing the well and hooking the home to the municipal water supply.

The Village Well No. 5 which supplies the drinking water for homes in this area, with the exception of the 9 private water supply wells described previously, is located approximately 2,200 ft to the east of the area of impacted groundwater. Groundwater flow in the impacted area is shown to be away from the municipal well (i.e. note the differences in plume locations on Drawings A6 and A7). For these reasons, the municipal well should not be impacted by the TCE in this area. This is supported by the lack of TCE detected in well W49C located near the municipal well (see Table 4-10 of the RI) and the lack of TCE detected in the analysis of water from Village Well No. 5. Thus, exposure to TCE was not considered a complete exposure pathway under current NPL Site conditions for residents living in this area.

It should be noted that based upon the groundwater flow path measured in the past, this municipal well is not anticipated to be impacted. Furthermore, based upon past and future anticipated water use scenarios, it is unlikely that the pumping rate on this well will increase sufficiently to redirect the impacted groundwater plume flow towards the well. At the current pumping rate of approximately 750 gpm, the radius of influence for this well is only estimated to be approximately 1,000 ft, due to the high transmissivity nature of this aquifer. Further information on this estimate can be found in Appendix A of Technical Memorandum 4 (Montgomery Watson 1998). Presently, the estimated edge of the plume is at least 2,000 ft from this municipal supply well (see Drawing A7), and is not migrating towards this well (see differences between Drawings A6 and A7). For this reason, this pathway was considered incomplete under future conditions, too.

It is not known whether the nine private wells will be affected by the TCE plume in the future. Due to the lack of information regarding the construction of the wells, it is difficult to reliably predict whether these nine private wells will become affected by the TCE plume in the future. For this reason, an evaluation of the hypothetical health risk associated with consumption of the groundwater has been conducted for informational purposes because of the possibility that concentrations of chemicals detected in the upgradient monitoring well W47C maybe found in these private wells in the future.

Southern Blackhawk Acres Subdivision Wells

Residents with constituent concentrations in wells below MCLs have not been provided point-of-entry treatment systems. Risks to these residents have been quantified. This analysis was performed under the category of "Other Blackhawk

Acres Subdivision Wells", and includes southern, eastern, and northern Blackhawk Acres subdivision wells.

Under current land use conditions, no residents in this area are known to use groundwater with constituent concentrations above MCLs. The three residences with water exceeding MCLs (i.e., 910, 914, and 918 Watts) have been provided with point-of-entry treatment systems installed and maintained by the IEPA to remove the PCE and 1,1,1-TCA from the groundwater prior to use. The point-of-entry treatment systems were installed and are maintained by Culligan for the IEPA. The treatment systems are composed of dual carbon filtration tanks, which are used to remove the constituents from the water. For this reason, under current NPL Site conditions, use of chemically impacted groundwater was not considered a complete exposure pathway for these residents.

Under future NPL Site conditions, it is considered highly unlikely that these residents would be exposed to chemically impacted groundwater, because it is expected that these treatment systems will be maintained. However, even though it was considered unlikely that residents would be exposed to impacted groundwater in the future, the risk associated with hypothetical long term exposure to the groundwater was assessed. This quantitative analysis is provided for informational purposes to show what the risk associated with groundwater exposure may have been if action had not been taken to mitigate exposure to the PCE and 1,1,1-TCA in the groundwater.

Northern Blackhawk Acres Subdivision Wells

The VOCs present in the northern portion of the Blackhawk Acres subdivision were limited to chloroform, centered at 1310 Blackhawk Avenue (14 ug/L). Chloroform concentrations in this area have declined to below detection limits in recent sampling. The source of chloroform based on the RI data appears to occur from discharges at a residence at or upgradient of 1310 Blackhawk. Under current NPL Site conditions, the residents in this area use this groundwater. The concentrations of chloroform are below the Federal drinking water standard and, therefore, the IEPA has not considered it necessary to install point-of-entry treatment systems at the residences in this area. For this reason, use of groundwater impacted by chloroform by residents in this area was considered a complete exposure pathway.

Residents within the Northern Blackhawk Acres subdivision with other constituents in groundwater have also had risks estimated. As stated above, this analysis was performed under the category of "Other Blackhawk Acres Subdivision Wells."

Eastern Blackhawk Acres Subdivision Wells

An isolated occurrence of TCE was identified in the raw water at 1102 Blackhawk Avenue. Like the Southern Blackhawk Acres Subdivision Wells along Watts, this residence was placed on a point-of-entry treatment system. For this reason, the risks associated with the TCE impacted groundwater at this residence was handled the same as the Southern Blackhawk Acres Subdivision Wells. That is, under current and

future NPL Site conditions, it was considered unlikely that the residents would consume groundwater with TCE concentrations above MCLs. However, a quantitative assessment of the risk associated with consuming the water at concentrations below MCLs was performed, and an assessment of risks associated with groundwater containing constituents above MCLs was retained for informational purposes.

It should be noted that based on the fact that chemically impacted groundwater is the only medium of concern at the local residences within the four areas described previously, soil and air are not considered media of concern on residential property for the reasons provided in the following two paragraphs.

In regards to soil, the limits of chemically impacted soils are contained within the industrial properties. Therefore, the potential ways that residents might be exposed to the chemicals directly in *industrial* soils would be to inhale fugitive vapors or dusts on residential properties. In addition, they could potentially ingest homegrown produce that would have chemically impacted fugitive dust deposited on the produce. However, none of these exposure pathways are considered to be complete for the reasons discussed in the following paragraphs.

In the limited areas where chemically impacted soils exist, they primarily occur in subsurface soil beneath structures, pavement or vegetation of *industrial* properties on the NPL Site. For this reason, fugitive dust would not be generated on the industrial properties, because impacted soils would need to be at the ground surface within bare areas for wind erosion to occur. For the same reason, the consumption of aerially deposited dusts on homegrown fruits or vegetables was not considered a complete exposure pathway for residents.

The vapor inhalation pathway was not considered complete because very low (part per billion) concentrations of volatile compounds were detected in industrial subsurface soils. Thus, the degree of release of chemical vapors to the atmosphere would be very low, and combined with the dilution from ambient air, concentrations would be considered negligible or of no significant public health concern. For this reason, inhalation of volatile soil vapors was not considered a complete exposure pathway for residents.

In regards to groundwater, there is one indirect exposure pathway (vapor intrusion) that under certain circumstances could lead to exposure of residents to constituents in impacted groundwater. Intrusion of volatile chemical vapors into buildings may occur if impacted groundwater lies directly below a building's foundation. Changes in barometric air pressure can cause the vapors released at the water table to be drawn up through the soil and in through cracks in the building foundation and floor. However, because of the depth of the water table (i.e., 25 ft bgs), any vapors present would be too deep to be effectively drawn upwards into the building, that is out of the zone of influence of barometric pressure changes. Therefore, vapor intrusion into the homes within these four areas would not be considered a complete exposure pathway.

5.2.1.1.2 Surface Water and Sediment - Local residents may come in contact with surface water and sediments in the Rock River if they use the reach (i.e., section) of the river adjacent to or near the NPL Site for recreational purposes. It was assumed that the most likely nearby residents that would use the River for recreational purposes would be children and teenagers. For this reason, the risks associated with children/teenagers occasionally using the river near the NPL Site were assessed. Two scenarios were assessed for children/teenagers using the river including:

- Contact and incidental ingestion of surface water from the Rock River near the point where the groundwater plume likely discharges to the river off the NPL site, and

- Contact and incidental ingestion of Rock River sediments located on and adjacent to the NPL site.

VOCs have not been detected in surface water of the Rock River associated with activities on the NPL Site. However, the potential exists that groundwater with TCE may reach the Rock River south of the NPL Site and south of the Village of Rockton. However, the concentration of TCE in surface water would not be expected to be detectable, because of the dilutional effects of the Rock River. The exposure potential for children swimming in the Rock River in this area South of the NPL Site where groundwater discharges was assessed, even though is was considered negligible or of no significant public health concern for purposes of this risk assessment.

The risks associated with children occasionally playing in the sediments on the Rock River at the analyte concentrations detected on the NPL site and south of the NPL site are provided for informational purposes. As mentioned previously (e.g., Section 3.5), sediments collected adjacent to the NPL Site do not appear to be impacted by the site.

It should be noted that children and teenagers may have the potential to catch and consume fish from the River, which would provide the potential for indirect exposure to chemicals in sediment. However, this potential exposure pathway is considered less significant than the other exposure pathways (i.e., direct contact with sediment) for the following reasons:

- Limited access is available to the river along the reach adjacent to the Beloit Corporation property. Thus, limited fishing occurs on the river adjacent to the site. The property is posted with no trespassing signs, and there are no public boat launches in the area to provide access to the river

- The chemicals detected in the sediments (i.e., PAHs and select metals) are not effectively bioconcentrated in fish tissue (i.e., the sediment to fish chemical transfer factors for these chemicals are much lower than one).

Therefore, the level of chemical exposure associated with fish consumption was considered negligible or of no significant public health concern for purposes of this risk assessment.

5.2.1.1.3 Soil - As mentioned previously, residents on or near the NPL Site could potentially be trespassers on nearby industrial properties. Evidence of trespassing has been observed on the Beloit Corporation property. For this reason, exposure to surficial soils on the Beloit Corporation property (only industrial property with substantial amounts of surface soil data) was assessed for residents who may occasionally trespass on the property. Again, because children were considered the most likely nearby resident to frequent the property, the exposure estimates were based on a child/teenager exposure scenario.

For this scenario, it was considered possible that children and teenagers trespassing on the Beloit Corporation property may contact and incidentally ingest soil while playing. For this reason, it was considered a complete exposure pathway to be assessed.

It should be noted that hunting activities have been observed on the Beloit Corporation property near the river, which would provide the potential for indirect exposure to chemicals in wild game. However, similar to fishing, it seemed reasonable to consider this potential exposure pathway less significant than the other exposure pathways (i.e., direct contact with soil) for purposes of this assessment for the following reasons.

- The surface area of soils impacted by chemicals is considered quite low compared to the home range of the primary game species (e.g., white-tailed deer). For this reason, deer would have a low frequency of exposure to chemically effected soils.

- The detected metals and low concentrations of PCBs in pockets of surface soils on the site are anticipated to be inefficiently transferred to plants, which are the main food source for any deer browsing within NPL site boundaries. PCBs were detected in only 7 of the 24 surface soil samples (as given in Table 3-2) collected on the site. The detected concentrations were also quite low, ranging from 0.024 to 0.36 mg/kg. These concentrations, combined with the high unitless soil retardation factors (R_d) for PCBs support the overall inefficient and low transfer of PCBs into site plants that may be consumed by deer. While metals concentrations within site soils were greater and somewhat more widespread, they are generally transferred inefficiently into plant materials. This combined with the fact that the transfer of these metals to humans through consumption of wild game would be a tertiary pathway (i.e. removed by two steps from the source, which should not result in significant exposure.

For these reasons, consumption of wild game by residents trespassing on site was considered a negligible exposure pathway or of no significant public health concern.

5.2.1.2 Employees. In the case of the current facility employees, the potentially complete exposure pathways included soil exposure in those areas of Beloit Corporation property where the soils were accessible (i.e., not covered by pavement, buildings, or dense

vegetation). The exception to this is the scenario that was previously mentioned where construction activities occur which expose soils that are currently inaccessible. While unlikely, this additional exposure pathway has been assessed for informational purposes. This pathway was evaluated using a conservative dust concentration of 1.0 mg/m^3. The selection of this emission factor is further described in Section 5.4.6.

It was considered unlikely that current employees would be exposed to soil other than on occasions when they were required to perform tasks in areas where exposed surficial soils exist. For example, on the Beloit Corporation property, the majority of the work is typically performed either indoors or outdoors on paved surfaces. For this reason, actual levels of soil exposure would likely be far less than those characterized by the exposure assumptions that were used to derive the exposure estimates in this risk assessment (refer to Section 5.4). The facilities for future workers could vary however, and potential exposure could increase above that which may currently occur. Future worker exposure to soil has been evaluated as a separate scenario.

Employees on the Beloit Corporation property are not anticipated to be exposed to contaminated groundwater, because the on-site drinking water wells draw water from well below the known depth of the impacted groundwater. On the Beloit Corporation property, the shallow groundwater has been impacted with PCE originating from the erection bay area (near well W23). Impacted soils within this area have been covered by the construction of the erection bay, an area of approximately 100 ft by 100 ft on the southwest side of the BCP. Impacted groundwater is approximately 25 ft below ground surface around the BCP. Based on the site hydrogeology, the deeper aquifer on the Beloit Corporation property is not expected to be affected in the future. In addition, a groundwater pump and treatment system has been installed as an Interim Source Control Action, and will be operated to reduce levels of VOCs in the shallow groundwater on and near the Beloit Corporation property, regardless of the source of VOCs. For this reason, in the future, employee consumption of chemically impacted groundwater is not expected to occur. However, as for residents on the NPL Site, a qualitative discussion of exposure and risk associated with the chemical analytes detected in shallow groundwater has been retained for informational purposes.

Soil gas concentrations within site surface soils were measured in Phases I and II of the RI, and the complete results are presented in Technical Memorandum 2 (Montgomery Watson 1996). While some VOCs were detected in these samples, because these vapor results were measured underneath the 8-10 in. thick structural concrete of the erection bay, little vapor penetration into the erection bay and BCP would be expected. Furthermore, the enormous volume of air contained and circulated through the BCP due to its size and heating, ventilation, and air conditioning (HVAC) system would result in significant dilution of any soil gas vapors that may penetrate into the building. In addition, like residential buildings, the depth of the impacted groundwater is great enough that vapor intrusion into buildings should not pose a health concern. For this reason, vapor intrusion from soils or groundwater beneath the building would not be considered a complete exposure pathway.

5.2.1.3 Construction Workers. Construction workers performing intrusive activities on site, such as digging excavation in areas of chemically impacted soils are anticipated to have the greatest potential for chemical exposure compared to residents and Beloit Corporation employees. While digging in the surface and subsurface soil, construction workers may be exposed to chemicals by direct contact with soil, incidental ingest of soil, and inhalation of dust and/or vapor emissions created during the excavation activities. The magnitude of vapor emissions is considered to be less significant than the emissions of fugitive dust, because fairly low concentration of VOCs were detected in soils (i.e., <1 mg/kg). For purposes of the risk assessment, it was assumed that construction workers have the potential to be exposed to soil concentrations detected at depths down to 10 ft bgs. An alternate hypothetical scenario was also assessed where construction workers were assumed to have the potential to be exposed to soil concentrations detected at any depth above the water table.

Similar to facility employees, the construction workers performing activities on the NPL Site should not be exposed to impacted groundwater. The depth to water table (>25 ft) is well below the typical depth of a utility trench or building excavation.

5.2.1.4 Summary of Current Land Use Pathways. In summary, the exposure pathways that will be evaluated under current land use conditions by receptor are summarized below. It should be noted that some exposure pathways are potentially complete under present site conditions, whereas a number of the exposure pathways are potentially complete under potential future site conditions. The distinction is summarized below.

5.2.1.4.1 Potentially Complete Exposure Pathways under Present Conditions - The following are the exposure pathways that are considered to be complete under present conditions and current land use on the NPL Site. Table 5-4 gives a figurative summary of these pathways.

Residents

- Use of groundwater from a private well from one of the following areas (quantitative assessment).

  ⇒ Northern Blackhawk Acres Subdivision Wells - No point-of-entry treatment systems, with concentrations of analytes below Federal drinking water standards.

  ⇒ Other Blackhawk Acres Subdivision Wells – No point-of-entry treatment systems, with concentrations of analytes below Federal drinking water standards.

- Incidental ingestion and dermal absorption of chemicals from surface water by children swimming in the Rock River at the point of groundwater discharge located south of the Village of Rockton and off the NPL Site.

- Incidental ingestion and dermal contact with sediment by children playing along the banks of the Rock River adjacent to the Beloit Corporation property.

- Incidental ingestion and dermal contact with sediment by children playing along the banks or in the Rock River south of the Village of Rockton. While no sediment quality data exists for this portion of the river, this potential pathway was assessed assuming soil/water partitioning and using the groundwater discharge model described in Section 5.3.1 of the RI report (Montgomery Watson 1999). COPC concentrations within these sediments are expected to be minimal due to river water dilution and dispersion of any impacted sediment particles over a wide area. The risks associated with this pathway are assessed qualitatively using the recreational swimming scenario.

- Incidental ingestion and dermal contact with surface soil by children trespassing on the Beloit Corporation property.

Employees

- Use of groundwater from a well on the Beloit Corporation property (qualitative only).

- Incidental ingestion, dermal contact with surface soil, and inhalation of fugitive dust by employees working in areas of exposed soils.

Construction Workers

- Incidental ingestion and dermal contact with surface and subsurface soils by construction workers digging in soils on the Beloit Corporation property.

- Inhalation of fugitive dusts and volatile vapors generated during digging activities.

5.2.1.4.2 Potentially Complete Exposure Pathways under Potential Hypothetical Future Conditions – the following are the exposure pathways that are considered to be potentially complete under hypothetical future conditions and current land use on the NPL Site.

Residents

- Use of groundwater from a private well from one of the following areas (quantitative assessment).

  ⇒ TCE Plume – Southern Wells South of the Beloit Corporation Property (Village of Rockton) – Hypothetical if one or more of the nine private wells in the Village of Rockton, which were never hooked up to the Village's municipal water supply, were impacted in the future

  ⇒ Southern Blackhawk Acres Subdivision Wells – Hypothetical as if the point-of-entry systems were not in operation

  ⇒ Eastern Blackhawk Acres Subdivision Wells – Hypothetical as if the point-of-entry systems were not in operation

Employees

- Incidental ingestion and dermal contact with surface soil and inhalation of fugitive dust, with a greater percentage being with contaminated soil as a result of work areas being located by contaminated soil.

- Employees hypothetically spending their careers working adjacent to construction projects and inhaling dust at a rate similar to construction workers.

5.2.2 Potential Exposure Pathways Under Hypothetical Future Land Use Conditions

The purpose of assessing exposures under potential future NPL Site conditions is to determine if there are reasonable land use changes (e.g., residential development), which could lead to increased human exposure to contaminated media. If such changes appear possible, exposure estimates are also determined based on the potential future land use conditions.

In general, exposure pathways that currently exist reflect the exposure pathways that will likely exist under future conditions. In addition, levels of contamination should not increase in the future, but are actually decreasing.

Under current land use conditions, residents currently live on the NPL Site, and risk associated with exposure to groundwater in the Blackhawk Acres subdivision (i.e., quantitative assessment for a number of subgroups), soils on the Beloit Corporation property, and Rock River surface water and sediment have been addressed for these potential residents. Based on the operation of the Interim Source Control Action, concentrations in downgradient wells should not increase in the future. However, this is not to imply that there will not be naturally occurring fluctuations in the existing

concentrations of chemicals in the groundwater. As the pump and treatment system reduces the source area, the concentrations of chemicals in groundwater will fall. This has been demonstrated with the groundwater monitoring that has been performed to date. In addition, the risks due to contact with soils on the Beloit Corporation property have been addressed for nearby residents. In the future, the potential for nearby residences to be exposed to these media should not increase.

The residents located to the south of the Beloit Corporation property and south of the NPL Site in the Village of Rockton are supplied with municipal well water, with the exception of the nine wells that were not connected to the Village of Rockton municipal water supply system in the 1950s. In addition, the only planned development near the NPL site is a new residential development located directly downgradient of the Beloit Corporation Property within the Village of Rockton. However, the homes in this development have been connected to the Rockton municipal water system. If a pond was made a part of the proposed development south of the NPL site, the pond will not be effected by the TCE in groundwater, because the depth to the chemically impacted groundwater is well below the depth of the proposed pond.

The only additional exposure pathway that could hypothetically be addressed under a future land use scenario is residential development of the Beloit Corporation property. However, based on the industrial zoning and historical record of industrial use, it is unlikely the Beloit Corporation property would be developed as a residential property. However, for informational purposes, the risks associated with a hypothetical resident located on the Beloit Corporation property using the shallow PCE impacted groundwater as a drinking water source has been provided in Section 6.2.2. The uncertainty associated with this future land use assumption is also addressed.

For the reasons stated above, the exposure pathways selected based on current NPL Site conditions should reasonably reflect the potential exposure pathways for residential receptors at the NPL Site in the future. However, the risks for hypothetical residential use of groundwater on the Beloit Corporation property were assessed for informational purposes.

5.3 QUANTIFICATION OF EXPOSURE POINT CONCENTRATIONS

In order to calculate the magnitude of exposures and the associated risks that may be experienced by an individual, the concentration of the COPCs in the exposure medium must be known or estimated. This concentration is referred to as an exposure point concentration. In order to estimate exposures, this concentration is combined with assumptions regarding the rate and magnitude of contact with the constituent. Exposure point concentrations for soil, groundwater, sediment and surface water exposure pathways were determined using the complete RI data set. Only those data not meeting the data validation criteria were excluded from the data set. A summary of the data quality and validation analysis for all four phases of the RI is provided in Appendix F. The following

text summarizes the basis for the exposure point concentrations for each complete pathway to be quantitatively evaluated.

5.3.1 Concentrations in Soil

As mentioned previously, for the calculation of soil risk estimates, the maximum chemical concentrations in soil were used to represent the exposure point concentration for each receptor group. The soils data were segregated into two depth categories: (1) soils potentially available for contact by construction workers or employees if soils are unearthed in the future (i.e., between 0 ft and 10 ft below ground surface) and (2) surface soil samples that employees and trespassers may have exposure to under current conditions. Surface soil samples were defined as a depth of 1 ft or less below ground surface. A third supplementary depth category was analyzed for reference purposes that uses all of the available soil data for risk analysis (i.e. all depths down to the water table).

It was considered reasonable to assume that current facility employees and trespassers would be exposed only to exposed surface soils on the property under current land conditions, and therefore the maximum surface soil concentration in nonpaved areas was used to represent the exposure point concentration for these receptors.

In the future, construction workers would have the potential to be exposed to surface and subsurface soil if construction activities included trenching or excavating. For this reason, the maximum concentration of a chemical from any soil sample collected within 10 ft bgs was used to represent the exposure point concentration for construction workers.

In addition, it is anticipated that once construction work is complete, a mixture of surface and subsurface soils may potentially exist in areas where maintenance or construction took place. For this reason, the soil exposure point concentrations used for construction workers were used for an additional scenario for employees potentially exposed to these soils.

5.3.2 Concentrations in Groundwater

To support the discussion of risk associated with current or future hypothetical groundwater use, the maximum chemical concentrations detected in each area were used to represent the exposure point concentration for residents in the particular area. For informational purposes the maximum concentration of a contaminant in any one monitoring well groundwater sample was used as the exposure point concentration without averaging over the multiple rounds of sampling. This data was used to represent the worst case level of exposure a hypothetical resident on the Beloit Corporation could have to groundwater.

For private wells, the only statistical analysis performed consisted of averaging the concentration of the chemical over the latest two rounds of sampling at the location where the maximum chemical concentration was detected within an area. The arithmetic mean for the detects was used to represent the exposure point concentration. For all analytes detected in earlier rounds of sampling, except PCE, the most current round of sampling has

shown no detect of the analytes. In these cases, the average concentration detected previously was used to represent the exposure point concentration. These exposure point concentrations represent a level of past potential exposure, rather than current levels of potential exposure and have been **bolded** to highlight them on Table 5-1. For those wells where point-of-entry treatment occurs, it should be noted that this approach is conservative as it assumes that there is no point-of-entry groundwater treatment. In addition, with the exception of PCE, no VOCs were detected in the most current round of groundwater sampling from each well. This will be discussed qualitatively within the Risk Characterization Section.

5.3.3 Concentrations in Rock River Sediment

The sediment data were segregated into upstream of the facility data (SD01), and downstream data (all other samples). The maximum concentration of each analyte in the downstream samples were used to represent the exposure point concentration for children/teenagers that live in the residences near the NPL Site and may use the Rock River for recreational purposes. As mentioned earlier, the concentration of chemicals at sediment sample SD07 did not appear to be related to the NPL Site (refer to Section 3.5), and therefore this sample was not used to determine the exposure point concentration for this pathway. Rather the risk associated with this particular sample is provided for informational purposes within the Risk Characterization.

5.3.4 Concentrations in Rock River Surface Water

A single surface water sample (SW01) was collected in the Rock River at the western edge of the NPL Site adjacent to the Beloit Corporation Property, but no organic contaminants were detected. This single sample was collected for the specific purpose of determining if organic chemicals had impacted the River near the Beloit Corporation property. Surface water samples were not collected from the River in the area where groundwater is anticipated to discharge to the Rock River south of the Village of Rockton and off the NPL site. Rather, using the conservative approach, the maximum concentration of TCE detected in a monitoring well off the NPL site (i.e., W47C April 1998), was used in combination with groundwater discharge estimates, and Rock River flow data to estimate the concentration of TCE in the Rock River at the point of discharge. However, the predicted concentration of TCE in surface water would be undetected, because it is negligible. The modeled TCE surface water concentration was used as the exposure point concentration for children/teenagers that may swim in this section of the River. Refer to Section 5.3.1 of the RI report (Montgomery Watson 1999) for a description of the model used to predict the TCE surface water concentration.

5.4 QUANTIFICATION OF EXPOSURE

Exposures are estimated by combining predicted environmental concentrations at the selected exposure points with information describing the extent, frequency, and duration of exposure for each receptor of concern. This section presents an overview of the approaches used to quantify exposures, followed by specific details for each selected exposure pathway. The approaches used in this section to quantify exposures are consistent with guidance produced by the U.S. EPA (1989a, 1991b) and the IEPA (1996).

For the ingestion, inhalation and dermal absorption routes of exposure, quantification of exposure involves the estimation of an average chronic daily intake (referred to as a CDI) or doses expressed in units of mg of constituent/kg body weight-day (mg/kg-day). Dose can be defined as an exposure rate to a chemical determined over an exposure period per unit body weight, and it is calculated similarly for both ingestion, inhalation and dermal routes. There are, however, significant differences in the meaning and terms used to describe doses for the ingestion and inhalation, and dermal routes. For the oral and inhalation routes of exposure, the doses calculated in this assessment are referred to as "administered doses". The administered dose is the amount of chemical ingested or inhaled, and is analogous to the administered dose in a dose-response toxicity experiment. For the dermal absorption pathways, the estimated dose is referred to as an "absorbed dose". The absorbed dose reflects the amount of chemical that has been absorbed into the body and is available for interaction with biologically important tissues.

Average CDIs are estimated differently for chemicals exhibiting noncarcinogenic effects and those exhibiting carcinogenic effects. Average CDIs for noncarcinogens are averaged over the duration of exposure. For carcinogens, average daily doses are averaged over a lifetime.

The CDIs are estimated using exposure point concentrations of chemicals together with other exposure parameters that specifically describe the exposure pathway. Based on U.S. EPA risk assessment guidance (U.S. EPA 1989a, 1991b), exposures were quantified by estimating the reasonable maximum exposure (RME) associated with the pathway of potential concern. The term RME is defined as the maximum exposure that is reasonably expected to occur at a site (U.S. EPA 1989a). In terms of U.S. EPA's recent exposure assessment guidance (U.S. EPA, 1992b), the RME risk estimates can be termed as high-end risk descriptors, using the reasonable worst case. The RME is intended to place a conservative upper bound on the potential risks, meaning that the risk estimate is unlikely to be underestimated, but it may very well be overestimated. The likelihood that this RME scenario may actually occur is small, due to the combination of conservative assumptions incorporated into the scenario. The RME for a given pathway is derived by combining the selected exposure point concentration of each chemical with reasonable maximum values describing the extent, frequency, and duration of exposure (U.S. EPA 1989a). Many of the exposure parameter values used in this assessment have been defined by U.S. EPA (1989a, 1991b) for the RME case.

5.4.1 Average Chronic Daily Doses

Exposures associated with ingestion, inhalation, and dermal contact with a medium were assessed when applicable. The equations used in quantifying chemical exposures are presented in Table 5-2 and the exposure factors are presented in Table 5-3. It should be noted that based on IEPA guidance (IEPA 1994) dermal exposures estimates were not calculated for PAHs in soils, but rather the dermal risk was assumed to be equal to the oral risk.

Some exposure factors (e.g., exposure duration) are also summarized in more detail below. The exposure point concentrations are presented in the appropriate risk tables (i.e., refer to Appendix D) along with the calculated CDIs.

5.4.2 Inhalation, Dermal Contact and Incidental Ingestion of Soil

Potential exposures through incidental ingestion of and contact with soils were estimated for nearby residents who may trespass on Beloit Corporation property, employees, and hypothetical construction workers. Inhalation of fugitive dusts and volatile vapors was assessed for construction workers and Beloit Corporation employees.

Children and teenagers from 7 to 16 years of age were selected as the receptors to be evaluated for the trespasser soil exposure scenario, as this age group is the most likely to contact soil through play or other activities. Adults were selected for the other two soil exposure scenarios.

5.4.3 General Exposure Factors for Soil Contact

The *frequency of exposure* estimates for soil contact for trespassers were based on the climatic conditions specific to the area of the NPL site. It was assumed that children and teenagers would trespass 4 days/week in June through September (i.e., 70 days/year), the four months when the average daily maximum air temperatures are above 70°F (NOAA, 1989) in northern Illinois. Duration of exposure was based on the age range of children and teenagers expected to visit these areas (7 to 16 years of age).

For employees, the U.S. EPA's default frequency and duration of exposure (25 years/250 days per year) were used for purposes of the risk assessment as conservative values. These exposure estimates were considered to represent a reasonable upper limit of exposure for an individual and overestimate the likely level of exposure most current employees would have. This is because the small areas that contain impacted soils within the FSDA and FSSA are outside the plant in remote areas of the Beloit Corporation Property, which employees do not normally frequent. These values are considered more plausible, but still conservative, for potential future workers.

The exposure frequency and duration for construction workers was based on the consideration of the length of construction activities that might expose a worker to soils.

The default exposure frequency for construction worker (45 day/year) developed by the IEPA (IEPA 1996) was used to estimate the time a hypothetical construction worker may be exposed to soil during a given construction project. The duration of exposure was assumed to be one year or less, which again is an IEPA default value (IEPA 1996). This was considered a reasonable length of time for most construction projects, because the majority of projects only have a brief earth-moving phase.

5.4.4 Incidental Ingestion Factors for Soil Contact

The *soil ingestion rate* variable for this pathway was assumed to be equivalent to the standard soil ingestion parameters suggested for children over six years of age (100 mg/day), employees (50 mg/day) and construction workers (480 mg/day) (U.S. EPA, 1991b).

The *fraction ingested* (FI) value represents the proportion of the soil that is ingested from affected areas on the site. This parameter was conservatively assumed to be 1 for trespassers and construction workers. For current facility employees, it was assumed that 25 percent (FI = 0.25) of the soil ingested was from areas of the site where chemical constituents had been released. This assumption was based on the fact that employees spend most of their time working inside or outside the facility on paved surfaces away from areas of surface soils where chemical exposure could potentially occur. As a conservative measure, an FI of one was used for potential future workers.

5.4.5 Dermal Absorption Factors for Soil Contact

Additional parameters needed to assess the dermal exposure scenario include the area of exposed skin, the amount of soil adhering to the skin, the amount of soil adhering to the skin from contaminated areas, and the amount of chemical absorbed through the skin from soil. For child and teenage trespassers, it was assumed that the hands, arms, feet, legs, neck and head would be exposed to soil. It was assumed that other parts of the body would not directly contact soil while on the site. Using data from U.S. EPA (1992 and 1989), and averaging across gender and age, it was estimated that the exposed skin surface area for child and teenage trespassers playing in soil would be 4,700 square centimeters (cm^2). The reasonable worst case skin surface area for adults (5,800 cm^2) presented in Dermal Exposure Principles and Applications (EPA 1992) was used to represent the skin surface areas available for skin contact for employees and construction workers. The *soil-to-skin adherence factor* was assumed to be 1.0 mg/cm^2-event, the reasonable upper default value provided by U.S. EPA (1992a) for all three receptors. For the same reasons as for soil ingestion, the fraction of soil from contaminated sources was assumed to be 1 for trespassers, construction workers, and potential future facility workers, and 0.25 for current facility employees.

The amount of chemical that is absorbed through the skin into the body from soil is needed to estimate the dose resulting from dermal exposures to soil. There is no standard set of exposure assumptions for *fraction of dermal absorption* of the chemicals of potential

concern detected in soil at the site. Dermal absorption of chemicals bound to sediment is a function of permeability of the skin, surface area exposed, sediment binding capacity for each constituent, and length of exposure. Estimates of the rate of absorption of chemicals from soil are not available for most contaminants, therefore default values were estimated using IEPA guidelines which utilize a method developed by McKone (1991) to select a particular default value for each chemical (IEPA 1994). Consistent with this IEPA guideline, no dermal absorption value for PAHs was used, because the risk due to PAH soil exposure was estimated by doubling the oral ingestion risk estimate. Refer to Table 4-1 for the dermal absorption estimates for each chemical of potential concern.

5.4.6 Inhalation Exposure Factors for Soil

For the construction worker soil exposure scenario it was considered possible that construction workers may trench or excavate into impacted soils. Facility employees were considered in typical locations, and in areas near the construction work. To estimate the magnitude of chemical exposure due to inhalation, the amount of air inhaled during a workday, and appropriate transfer factors for impacted soil/dusts were estimated.

The recommended inhalation rate of 1.3 cubic meter (m^3) of air per hour for outdoor workers was used for the construction worker population (U.S. EPA 1997), and it was assumed that the work day would be approximately 8 hours in duration. This inhalation rate was also used in performing the inhalation exposure to Beloit Corporation employees that may periodically be performing outdoor work in areas with exposed soils.

To estimate the concentration of dust and volatile vapors that were inhaled by construction workers during construction activities, a conservatively high dust concentration of 1 mg/m^3 was assumed. This dust concentration is much greater than that calculated from the particulate emission factor (PEF) for a TACO construction worker. The relationship between the PEF and the dust concentration is as follows:

$$\text{Dust Concentration } (mg/m^3) = 1/(\text{PEF } (m^3/kg) \times 10^{-6} \text{ } (kg/mg))$$

Under TACO, the PEF for a construction worker is 1.24×10^8 m^3/kg. The resulting dust concentration is 0.008 mg/m^3 (IEPA 1997).

For the Beloit Corporation employees which would not be expected to be directly working in excavation type scenarios, dust concentrations would be expected to be lower. For this reason, the dust concentration used was the calculated TACO construction worker concentration of 0.008 mg/m^3. This dust concentration is still considered a conservative estimate since it is for construction workers, rather than typical plant employees. Furthermore, under typical construction scenarios, various dust control measures such as wetting or ground cover techniques, are utilized to control dust generation in the construction area. For this scenario, it was assumed that all of the dust inhaled was respirable (i.e., small enough to enter the lung region where chemical absorption occurs). As with the ingestion and dermal exposure routes, all of the dust inhaled by construction

workers and potential future employees was assumed to be from contaminated sources, whereas only 25 percent of the dust inhaled by current workers was assumed to be contaminated.

5.4.7 Dermal Contact and Incidental Ingestion of Rock River Sediment

Potential exposures through incidental ingestion of and contact with Rock River sediment were estimated for nearby residents who may occasionally visit or play near the reach of the river that flows by the Beloit Corporation property and near the reach of the river that flows south of the village, in the area where impacted groundwater may discharge. This second scenario is added qualitatively for reference purposes, because no sediment quality data exists for this portion of the river and the risks are expected to be minimal due to river water dilution and dispersion of any impacted sediment particles over a wide area. Children and teenagers from 7 to 16 years of age were selected as the receptors to be evaluated for this pathway, as this age group is the most likely to contact sediment through play or other activities.

For purposes of the risk assessment, the soil exposure factors presented above were used to characterize the magnitude of sediment exposure. This approach is considered conservative because it is unlikely that the River reach adjacent to the BCP would be frequented as often as upland areas, because of its remote nature. In addition, there are no published values that have been provided to separately characterize sediment exposure, and therefore, this approach is considered acceptable due to the lack of better information.

5.4.8 Inhalation, Dermal Contact and Ingestion of Chemicals in Groundwater

The following section addresses the key exposure factors that were used to develop chemical intakes from groundwater under current or hypothetical future NPL Site conditions.

5.4.9 General Exposure Factors for Groundwater

The drinking water exposure duration used in this evaluation assumed residents lived in the Blackhawk Acres subdivision from age 0 to 30 years of age, and drank raw untreated water. This age group was selected as it accounts for the potentially sensitive child receptors, and it is the default value recommended by U.S. EPA (U.S. EPA 1991). The average body weight of a resident was estimated to be 59 kg (i.e., 130 lbs), which is a time and gender weighted average for the 30 year exposure duration. The exposure frequency used was the standard default value suggested by U.S. EPA of 350 days per year (U.S. EPA 1991).

5.4.10 Ingestion Factors for Groundwater

A daily water ingestion rate of 2 liters (L) or approximately 0.5 gallons of water was used to estimate chemical exposure due to water consumption. This value represents a reasonable

maximum level of exposure (U.S. EPA 1991) and assumes all liquids that are consumed on a daily basis are derived from water obtained from a given private well.

5.4.11 Dermal Absorption Factors for Groundwater

Estimation of chemical doses via dermal absorption from water while showering requires an estimation of the exposed skin surface area, the permeability coefficient for the chemical from water through the skin, and exposure time. For this assessment, it was assumed that bathing would be for 15 minutes daily. The assessment performed was for an age integrated, child/adult scenario. The reasonable maximum estimate for *skin surface area* exposed while bathing (23,000 cm^2) provided in U.S. EPA (1992a) was used in the risk assessment.

A *permeability coefficient* is defined as a flux value, normalized for concentration, and represents the skin penetration rate for a specific chemical (in units of cm/hr). Experimental or measured permeability coefficients provided in U.S. EPA (1992a) were used for the chemicals of potential concern if available. In the absence of measured values for organics, permeability coefficients were estimated using methods provided by the U.S. EPA (1992a).

Inorganics without measured permeability coefficients were assumed to have permeability coefficients of 10^{-3} cm/hr, the default value provided by U.S. EPA (1992a). Permeability coefficients of the chemicals of potential concern used in this assessment are presented in Table 3-1.

5.4.12 Inhalation Factors for Groundwater

Inhalation exposures to volatile chemicals while showering with raw well water were calculated for Blackhawk Acres subdivision residents. The shower room exposure dose estimates were calculated using a shower model developed by Andelman (1985) and described in Appendix C.

The parameters used to assess inhalation exposures while showering are also shown in Appendix C. These include an exposure time of 27 minutes (15 minutes with the shower on and 12 minutes in the shower room after the shower is turned off).

In addition, to qualitatively assess the risk due to all sources of domestic water use (bathing, clothes washing, dishwashing, etc.), the risks associated with the shower scenario were reviewed in light of the data presented in McKone (1989). This paper looks at the relative contribution of each exposure route to the inhalation pathway for domestic water use. According to his analysis, the concentration of a VOC in air in a shower was approximately 20 times the water concentration, whereas EPA studies had shown that in the rest of the house, the VOC concentration in air was 1/20 the water concentration (McKone, 1989; Wallace, 1986). Based on this information, the shower model used alone may slightly underestimate the level of exposure through the inhalation route, but is still adequate to characterize risk. This will be discussed in the uncertainty section of the BlRA.

5.4.13 Dermal Contact and Incidental Ingestion of Rock River Surface Water

Potential exposures through incidental ingestion of and dermal contact with Rock River surface water were estimated for nearby residents who may occasionally visit or play near the reach of the River where groundwater containing VOCs is predicted to discharge. Children and teenagers from 7 to 16 years of age were selected as the receptors to be evaluated for this pathway, as this age group is the most likely to swim in the River. As for soils and sediment, it was assumed the exposure frequency for swimming was no greater than 70 days/year based on the number of days that temperatures would be warm enough that children or teenagers would attempt to swim.

5.4.14 Dermal Absorption Factors for Surface Water

Estimation of doses via dermal absorption from water requires an estimation of the exposed skin surface area, the permeability coefficient for the chemical from water through the skin, and exposure time. For this assessment, it was assumed that children and teenagers would swim in the River totally immersed. Using data provided by U.S. EPA (1992a), and averaging across age, it was estimated that the average *skin surface area* exposed to surface water while swimming would be 12,900 cm^2. It was also assumed that children and teenagers would contact surface water 1 hour each time they swam in the Rock River (1 hour/event) in the area where groundwater discharges south of the Village of Rockton and the NPL Site. This represents the reasonably maximum exposure (RME) estimate for the length of a swimming event (U.S. EPA, 1992a).

The same *permeability coefficient* described previously for assessing dermal absorption of chemicals while bathing were used to assess dermal absorption while swimming. The permeability coefficients for the chemicals of potential concern can be found in Table 3-1.

5.4.15 Incidental Ingestion Factors for Surface Water

It was assumed for purposes of the risk assessment that children swimming in the River would incidentally ingest some surface water. The U.S. EPA has estimated that 50 mL/hr of water is consumed while swimming (U.S. EPA 1989a).

5.4.16 Summary of Exposure Assessment

The exposure assessment was performed to identify human populations potentially exposed to chemicals detected in media on the NPL Site. Theses human populations included a resident, employees and hypothetical construction worker population. In addition, levels of potential exposure were quantified for each potentially complete exposure pathway. The estimates of chemical exposure are used with estimates of toxicity to predict health risks in the next section of this report.

6.0 RISK CHARACTERIZATION

In this section, the human health risks potentially associated with the human exposure pathways identified in Section 6.4 are discussed. This section discusses how calculated exposure doses are converted into potential health risks. The health risks are presented by potentially exposed population and medium.

6.1 GENERAL METHODOLOGY

Risk characterization involves the integration of health effects information developed as part of the dose-response assessment with exposure estimates developed as part of the exposure assessment. The result is a quantitative estimate of chronic noncarcinogenic risks based on the presumption that a threshold dose is required to elicit a response, as well as a quantitative estimate of carcinogenic risks presumed to exist regardless of the dose. These estimates are usually presented in either probabilistic terms (e.g., one-in-one-million), or with reference to specific benchmark or threshold levels. Because risk estimates are based on a combination of measurements and assumptions, it is important to provide information on sources of uncertainty in risk characterization. The key elements of risk characterization included in this section are: an estimation of risk, a presentation of risk, and an uncertainty analysis.

6.1.1 Carcinogenic Risks

Public health risks are evaluated separately for carcinogenic and noncarcinogenic effects. The excess lifetime cancer risk is an estimate of the increased risk of cancer which results from lifetime exposure, at specified average daily dosages, to chemicals detected in media at a site. Excess lifetime cancer risk, equal to the product of the exposure dose and the slope factor, is estimated for each known, probable, or possible carcinogenic chemical in each medium. The risk values provided in this report are an indication of the increased risk, above that applying to the general population, which may result from the exposure scenarios described in the Exposure Assessment in Section 6.4. The risk estimate is considered to be an upperbound estimate; therefore, it is likely that the true risk is less than that predicted. Current regulatory methodology assumes that excess lifetime cancer risks can be summed across routes of exposure and chemicals to derive a "Total Site Risk" (U.S. EPA, 1989a). The U.S. EPA (1991d) has stated that sites with an excess lifetime cancer risk less than 10^{-4} (1 in 10,000) generally do not warrant remedial action. It is important to note though that the site risk manager and responsible regulatory agency may determine the appropriate risk goals for the site.

The incremental risk is calculated for each exposure scenario based on the following basic equation:

Cancer Risk = Exposure Dose x Slope Factor

where the cancer slope factor (CSF) is in units of $(mg/kg/day)^{-1}$ based on a compound specific cancer bioassay dose response curve.

The exposure dose is adjusted over a 70-year lifetime. The summation of dose is in keeping with the concept that for genotoxic agents there exists no threshold dose and implies that total, lifetime exposure is of greater importance than the actual dose during the exposure event(s). Ingestion and inhalation risks are calculated separately since compounds often have different CSFs for differing routes of exposure. The different CSFs relate to the pharmacokinetics inherent in each chemical/organ and the specific routes of uptake.

Slope factors are derived by EPA in an intentionally conservative way, that is, the actual risk is not expected to exceed the predicted risk, and could be considerably lower. Cancer risks calculated using these conservative slope factors and reasonable maximum exposure estimates are upper bound estimates of excess cancer risk potentially arising from exposure to the chemicals in question. A number of assumptions have been made in the derivation of these values, many of which are likely to overestimate exposure and toxicity. The actual incidence of excess cancers is likely to be lower than these estimates and may be zero.

Lifetime daily intakes, using an averaging time of up to 70 years, effectively prorates the total cumulative dose over a lifetime. This approach is based on the assumption for carcinogens that a high dose received over a short period of time at any age is equivalent to a corresponding low dose received over a lifetime (U.S. EPA 1989a). This assumption is unlikely to be true for all carcinogens, and introduces uncertainty into the assessment of potential risk. This assumption may also lead to an overestimate or underestimate of potential risk, depending upon the actual timing of exposure and the mechanism of action of individual carcinogens.

6.1.2 Noncarcinogenic Health Risks

The hazard quotient (HQ) is the ratio of the estimated exposure dose to the reference (RfD). This ratio is used to evaluate noncarcinogenic health effects due to exposure to a chemical. An HQ greater than 1.0 indicates that the estimated exposure dose for that chemical exceeds acceptable levels for protection against noncarcinogenic effects. Although an HQ of less than 1.0 suggests that noncarcinogenic health effects should not occur, an HQ of slightly greater than 1.0 is not necessarily an indication that adverse effects will occur.

The EPA has developed a set of health based benchmark numbers, called reference doses, or RfDs, as guideposts in a risk assessment. Reference doses are an adaptation of the earlier toxicological measure of "acceptable daily dose" or ADI. The unit of a reference

dose is mg contaminant/kg body weight/day. The potential for adverse effects on human health (other than cancer) is evaluated by comparing an intake over a specific time period (subchronic or chronic) with a reference dose derived for a similar exposure period.

The HQ is the ratio (unitless) of the estimated exposure dose of a compound to a reference dose (RfD) judged to be without adverse effects given long-term exposure. Thus, the quotient is used as a measure of potential noncarcinogenic health risks. Due to the margin of safety built into the RfD value, exceedance of the number has no immediate meaning with regard to specific health effects, the frequency of effects, or the magnitude of effects. However, exceedance of the number should serve as an indicator that the potential for unacceptable exposure does exist and further evaluation needs to be considered. The effects of noncarcinogens in the body vary greatly with regard to potential target organs, threshold dose, and "severity" of effect. Therefore, the individual toxicity for each compound needs to be assessed with the following equation:

Hazard quotient (HQ) = exposure dose/reference dose

If the HQ is less than 1.0, then no chronic health effects are expected to occur. If the HQ is greater than 1.0, then adverse health risks are possible. In the case of noncarcinogenic effects, chronic exposure below a threshold dose results in a non-response or a diminished response.

The sum of the HQs is termed the hazard index (HI). Current regulatory methodology assumes that HIs can be summed across exposure routes for all media at the NPL Site to derive a "Total Site Risk." The U.S. EPA (1991d) has stated that sites with a noncarcinogenic HI less than 1.0 generally do not warrant remedial action.

6.1.2.1 Placing Cancer Risk Values into Perspective. The magnitude of cancer risk relative to Superfund site remediation goals in the NCP ranges from 10^{-4} (one-in-ten-thousand) to 10^{-6} (one-in-one-million) depending on the site, proposed usage, and chemicals of concern (U.S. EPA, 1989a). Within this range, the level of risk which is considered to be acceptable at a specific site is a risk management decision, and is decided on a case-specific basis. Non-science issues such as technical feasibility, economics, social, political, and legal factors, all need to be considered in order to appropriately assign an acceptable risk level. This range of acceptable cleanup levels integrates science and public policy into the decision-making process. It is generally accepted that risks above this range require attention, however, risk below 10^{-4} may require remediation depending upon the particular site situation. The one in a million level of risk (expressed as 1E-06) is often referred to as the deminimus level of risk; risks calculated below this range would not require attention.

6.2 RISK ASSOCIATED WITH CURRENT NPL SITE AND SURROUNDING LAND USE CONDITIONS

The following is a discussion of the health risk associated with each site-specific exposure scenario (nearby resident, employee, and construction worker) by complete exposure pathway under current land use conditions. It should be noted that some risks for residents are applicable under present site conditions, whereas a number of the health risk estimates are potentially applicable under potential future site conditions. The distinction is summarized in the following subsections.

6.2.1 Residential Receptor Scenario - Present Conditions

The following are the exposure pathways that are considered to be complete under present conditions and current land use on the NPL Site.

- Use of groundwater from a private well from one of the following areas (quantitative assessment).

  ⇒ Northern Blackhawk Acres Subdivision Wells - No point-of-entry treatment systems, with concentrations of analytes below Federal drinking water standards.

  ⇒ Other Blackhawk Acres Subdivision Wells – No point-of-entry treatment systems, with concentrations of analytes below Federal drinking water standards.

- Incidental ingestion and dermal absorption of chemicals from surface water by children while swimming in the Rock River both next to the NPL site and south of the Village.

- Incidental ingestion and dermal contact with sediment by children playing along the banks of the Rock River both next to the NPL site and south of the Village.

- Incidental ingestion and dermal contact with surface soil by children trespassing on the Beloit Corporation property.

The following is a discussion of the potential health risks associated with groundwater by well grouping (e.g., Northern Blackhawk Acres Subdivision Wells), followed by a discussion of the health risks associated with the other media.

Northern Blackhawk Acres Subdivision Wells

Within the Northern Blackhawk Acres Subdivision Area there is a group of a few wells that contain chloroform below its MCL. The few residents in this area do not have point-of-entry treatment systems. For this reason, it was assumed for estimating

the health risk estimates for these residents that the groundwater would be used for all domestic water uses (i.e., drinking and bathing), and that residents would consume the water for 30 years. Based on these assumptions noncarcinogenic health effects are not anticipated (HI<1), and the cumulative cancer risk was equal to $5x10^{-5}$ (refer to Table D-4 in Appendix D). The cancer risk estimates are based on the maximally impacted well in this area, which contained up to 14 ug/L of chloroform, the only chemical contributing to the carcinogenic risks in this area. No other chemicals contribute to the potential health risks to these residents.

Other Private Wells Blackhawk Acres Subdivision

Of the 56 private wells sampled, they either had no detects of chemicals in the water (31 of 56 wells), or had only trace levels of chemicals below the drinking water standards (i.e., 25 of 56 wells). Six of the wells had trace levels of chloroform, and four wells are on point-of-entry treatment systems, which were discussed previously. This leaves 15 wells with trace concentrations of chlorinated VOCs which have not been discussed previously within this section. These other fifteen residents are currently consuming the groundwater from their private wells without treatment, because the concentrations of VOCs were below their respective Federal Drinking Water Standards (i.e., MCLs). The risks associated with these wells were assessed by using the maximum concentration of each chlorinated VOC detected in any of the fifteen wells. Based on this scenario, and the same exposure assumptions used for the other well groupings, no noncarcinogenic health effects would be expected (HI<1), and the cancer risk estimate was $7x10^{-6}$ (refer to Table D-5 in Appendix D). It should be noted that in these other wells, no analytes were detected above their reporting limit with the exception of PCE at 112 Blackhawk. PCE was the primary chemical contributing to the cancer risk. Other chemicals contributing to carcinogenic risks under this scenario are TCE and 1,4-dichlorobenzene. Table D-5 gives the breakdown and risk contribution from each chemical.

Based on this information, the present groundwater risks for each well grouping would be within the 10^{-6} to 10^{-4} risk range (refer to Figure 6-1).

Risks associated with children playing in the Rock River adjacent to the NPL site, and trespassing on the Beloit Corporation Property were assessed. The children living in homes on or near the NPL Site were considered the most likely receptors to use the River or trespass on the Beloit Corporation property. In addition, children are considered more sensitive to exposure, because of their lower body weight, and so are considered a reasonable worst case receptor for assessment of these exposure pathways.

Based on the groundwater monitoring data, the certain VOCs may be discharging with groundwater to the Rock River south of the NPL site and south of the Village of Rockton. These VOCs include TCE, 1,2-DCE, 1,1,1-TCA, and 1,1-DCE which were each measured in one or more of the monitoring wells south of the NPL site. As calculated in Section 5.3.1 of the RI report (Montgomery Watson 1999), even at a groundwater discharge TCE concentration of 180 ug/L (i.e. the concentration measured in well W47C in

the April 1998 monitoring event), the resulting concentration in the river south of the village would be 0.008 ug/L, which is a concentration below its limit of detection. This reduced (diluted) concentration is due to the high flow rate of the river in comparison to this discharge. The concentrations of the other VOCs were estimated to be below their limit of detection too. The concentration of TCE in the Rock River that would be due to groundwater discharge from this plume was estimated to be orders of magnitude below its limit of detection. For this reason, even though it was assumed that children would absorb and ingest TCE in the surface water while swimming, no noncarcinogenic health effects would be anticipated (i.e., HI<1), and the level of excess lifetime cancer risk ($2x10^{-10}$) was well below one-in-a-million (refer to Table D-6 in Appendix D).

Some COPCs were detected in the Rock River sediments sampled and analyzed adjacent to the NPL site. Their presence in the sediment samples did not appear related to the NPL Site, though (see discussion in Section 4.2.1 of the RI Report). However, for informational purposes, the health risks associated with children contacting and incidentally ingesting these sediments while playing were assessed. It was estimated that no noncarcinogenic health effects would occur in children exposed to the sediment (i.e., HI<1). In addition, the cumulative cancer risk ($2x10^{-6}$), was only slightly above the one-in-a-million point of departure (refer to Table D-7 in Appendix D). The primary chemicals contributing to the carcinogenic health risks include benzo(a)pyrene and arsenic. Table D-7 gives the breakdown and risk contribution from each chemical.

As discussed above, while no sediment quality data exists for the portion of the river south of the NPL site, sediment concentrations are expected to be minimal in this reach due to river water dilution and dispersion of any impacted sediment particles over a wide area. Concentrations and risks would be lower than by the NPL site. Based on the calculated risks for the sediments by the NPL site, risks south of the NPL site by the Village of Rockton would be expected to be *de minimis*.

As mentioned previously (Section 3.5), one of the sediment samples (SD07) was not used to estimate the health risk by the NPL site, because the presence of the elevated PAHs appeared to be an isolated occurrence unrelated to the NPL Site. Even if this sample had been included, the hazard index would still be below 1, and the cancer risk ($4x10^{-5}$) would still be below $1x10^{-4}$. Details on the breakdown and risk contribution from each chemical in this unlikely scenario are given in Table D-15.

Lastly, the health risks associated with children trespassing on the Beloit Corporation property were assessed. It was considered possible that the children may incidentally ingest and contact surface soils while exploring on the Beloit Corporation property. It was estimated that no noncarcinogenic health effects would occur in children exposed to the soil (i.e., HI<1). In addition, the cumulative cancer risk ($3x10^{-6}$), is slightly above the point of departure, but is well below $1x10^{-4}$ (refer to Table D-8 in Appendix D).

In summary, based on the concentration of chemicals at the Beloit Corporation property and the exposure conditions analyzed and discussed, noncarcinogenic health effects would

not be expected to occur in nearby residents, because total HIs for all potential exposure pathways are less than 1. In addition, the cumulative excess cancer risk levels associated with each medium was below or within the 10^{-6} to 10^{-4} risk range. Refer to Figures 6-1 and 6-2 for a comparison of the cancer risks by exposure pathway to the Superfund cancer risk range.

6.2.2 Residential Receptor Scenario – Hypothetical Future Conditions

The following are the exposure pathways that are considered to be potentially complete under hypothetical future conditions and current land use on the NPL Site.

Residents

- Use of groundwater from a private well from one of the following areas (quantitative assessment).

  ⇒ TCE Plume – Wells South of the Beloit Corporation Property (Village of Rockton) – Hypothetical if one or more of the nine private wells in the Village of Rockton, which were never hooked up to the Village's municipal water supply, were impacted in the future

  ⇒ Southern Blackhawk Acres Subdivision Wells – Hypothetical as if the point-of-entry systems were not in operation

  ⇒ Eastern Blackhawk Acres Subdivision Wells – Hypothetical as if the point-of-entry systems were not in operation

The following is a discussion of the potential health risks associated with each of these hypothetical scenarios.

TCE Plume - Wells South of the Beloit Corporation Property (Village of Rockton)

Based on private well test results, a single Village of Rockton resident (630 North Blackhawk) had a private water supply well impacted by TCE. As described previously, this impacted well has been removed, and residential exposure is not a complete exposure pathway in this area any longer.

Now that the well at 630 West Blackhawk has been removed, no water supply wells are currently impacted in this area. The Village of Rockton Well No. 5, which supplies the drinking water for homes in this area is located approximately 2,200 ft to the east of the area of impacted groundwater. Groundwater flow in this area is shown to be to the south towards the Rock River. Based on the RI groundwater monitoring data (i.e., wells W48C and W49C) plume migration is not towards the municipal well. For these reasons, the municipal well should not be impacted by the TCE in

this area. This is supported by the lack of TCE detected in well W49C, which is located near the municipal well (see Table 4-10 of the RI report) and the lack of TCE detected in water from Village Well No. 5 itself. These observations support the findings that groundwater flow from the NPL Site is not captured by Village Well No. 5. For this reason, under current conditions the TCE impacted groundwater would not be expected to pose a health concern.

It should be noted that in the future the municipal well is not anticipated to be impacted. At well No. 5's current pumping rate of approximately 750 gpm, the radius of influence is estimated to be only approximately 1,000 ft, due to the ubiquitous nature of this aquifer. This is further discussed in Section 5.2.1.1.1 of this report. Presently, the estimated edge of the plume is at least 2,000 ft from this municipal supply well (see Drawing A7), and is not migrating towards this well (see differences between Drawings A6 and A7). For this reason, the groundwater in this area is considered unlikely to pose a health concern under future NPL Site conditions.

However, for informational purposes, groundwater was evaluated assuming it was used at some point in the future. The maximum constituent concentrations ever detected at well W47C were used to evaluate this hypothetical scenario. Under this scenario, it was assumed that the groundwater would be used for all domestic water uses (i.e., drinking and bathing), and that residents would use the water for 30 years. Based on these assumptions, noncarcinogenic health effects could not be ruled out (HI = 1.8), and the cumulative cancer risk was equal to 2.8×10^{-4} (refer to Table D-13 in Appendix D). The primary contaminants contributing to the cancer risk estimates are TCE and 1,1-DCE. The constituents contributing most to the hazard index are TCE and carbon tetrachloride.

Southern Blackhawk Acres Subdivision Wells

Under current conditions, three private wells within the Southern Blackhawk Acres Subdivision Area were impacted by PCE above the MCL. These wells (910, 914, and 918 Watts Ave.) have point-of-entry treatment systems that were installed, maintained and monitored by the IEPA. The treatment systems are maintained by the IEPA to minimize the potential for the residents to be exposed to groundwater with concentrations of chemicals above the Federal drinking water standards. The IEPA has the point-of-entry treatment systems serviced on a regular basis to monitor proper performance. In addition, the IEPA samples the water from each of these private wells to confirm that the treatment systems are working properly (i.e., removing the chemicals).

Since the water is treated to remove the PCE, 1,1-DCE and 1,1,1-TCA prior to its use, the water does not pose a health concern under current conditions.

In the future, it is anticipated that the treatment systems will remain in place until they are no longer necessary to remove the PCE, 1,1-DCE, and 1,1,1-TCA from the groundwater. Despite the expected continued utilization of these systems, a

hypothetical scenario was assessed where it was assumed the point-of-entry groundwater treatment systems were not in place. Under this scenario, it was assumed that the groundwater would be used for all domestic water uses (i.e., drinking and bathing), and that residents would use the water for 30 years. Based on these assumptions, no noncarcinogenic health effects would be anticipated (i.e., HI<1), and the cumulative cancer risk was equal to $2x10^{-4}$ (refer to Table D-2 in Appendix D). The primary contaminants contributing to the cancer risk estimates are 1,1-DCE and PCE. It should be noted that these risks are conservative, because 1,1-DCE was not detected in these wells in the most current round of sampling. The cancer risk from exposure to only the PCE under this scenario is $4x10^{-5}$. Details on the risk contribution for each chemical, both noncarcinogenic and carcinogenic, are presented in Table D-2.

Eastern Blackhawk Acres Subdivision Wells

Within the Eastern Blackhawk Acres Subdivision area a single well (1102 Blackhawk Ave.) contained water with concentrations of TCE above its MCL. For this reason, the IEPA installed a point-of-entry treatment system at this well too. Like the other three residences where treatment systems were installed, the use of the water by the residents at this well is not expected to pose a health concern, because the TCE is removed by the treatment system. In addition, these treatment systems are expected to remain operating until the exposure risk has been eliminated.

In evaluating risks under the same hypothetical scenario assessed for the Southern Blackhawk Acres private wells (i.e., no point-of-entry treatment systems in place), consumption of the water would not pose a health concern. No noncarcinogenic health effects would be anticipated (i.e., HI<1), and the cumulative cancer risk was due solely to TCE exposure was equal to $5x10^{-6}$ (refer to Table D-3 in Appendix D). Details on the risk contribution for each chemical, both noncarcinogenic and carcinogenic, are presented in Table D-3.

6.2.3 Employees

Employees at the Beloit Corporation Plant, were considered to have a low potential to be exposed to soils, because the employees are normally working indoors away from areas of exposed soils. However, in areas where exposed surface soils occur, there is the potential for some level of exposure to chemicals in soil. For this reason, risk estimates were developed for employee exposure to surface soils.

Employees on the Beloit Corporation property were assumed to dermally contact, incidentally ingest, and incidentally inhale surface soils or fugitive dusts at certain areas of the NPL Site. Because most areas on the Beloit Corporation property are either covered by pavement or heavily vegetated, it was assumed that only 25 percent of soil contact would be with contaminated soil. However, even this value is thought to be conservative. Similar to trespassers, it was estimated that no noncarcinogenic health effects would occur in employees exposed to the accessible surface soils (HI<1). In addition, the cumulative

cancer risk is equal to $2x10^{-6}$, which is above the point of departure ($1x10^{-6}$), but well below $1x10^{-4}$ (refer to Table D-9 in Appendix D). These carcinogenic risks are primarily due to the potential exposure to benzo(a)pyrene, PCBs, arsenic, and chromium(VI). Details on the risk contribution for each chemical, both noncarcinogenic and carcinogenic, are given in Table D-9.

Potential future changes to the plant facility could result in different work areas than currently exist, with the resulting potential for 100 percent of exposure to be with contaminated soil. Under this scenario, the hazard index was 1.4 (Table D-10 in Appendix D). The scenario is sufficiently conservative such that it is still considered that there would be a low potential for health effects. For example, all of the chromium detected was assumed to be present in the hexavalent state. If chromium is actually present as trivalent chromium, the hazard index would be less than 1.0. The cancer risk was 8.6×10^{-6}, which is above the point of depature ($1x10^{-6}$), but still well below $1x10^{-4}$.

Potential future employees at the BCP may work more outdoors in areas adjacent to construction work more than under current conditions. Therefore, this scenario, the employees would be assumed to be exposed to the very conservative fugitive dust concentration of 1 mg/m^3, similar to the construction worker scenario, except with the longer exposure frequency and duration. The resulting HI value for this scenario is 2.2, which indicates the potential for some noncarcinogenic risks. However, it should be noted that this scenario assumed that these employees would only be exposed to the most contaminated surface soils, which is an unlikely situation. The resulting cancer risk for this scenario is $3x10^{-5}$, which is below 10^{-4}. These results, including the breakdown of individual noncarcinogenic and carcinogenic risks for each chemical are presented in Table D-14 of Appendix D.

It should be noted that the risks to lead could not be assessed quantitatively, because currently no U.S. EPA approved toxicity value for this metal exists. Rather, the concentrations of lead in soil were compared to the soil cleanup standard that has been used for Superfund (i.e. NPL) sites (400 mg/kg, U.S. EPA 1994). This cleanup standard is established as the threshold concentration, where soils containing lead concentrations below 400 mg/kg do not typically require remedial actions. A single lead soil exceedance of this action level (i.e., 827 mg/kg) occurred in the BCP area at surface soil sample (SB16), which was collected next to an outside water tower and beneath a layer of gravel pavement. This lead exceedance is likely related to weathering of lead-based paint from the water tower. No other samples approached the 400 mg/kg value. Therefore, because of the isolated nature of the lone exceedance, and it was detected beneath gravel pavement, lead would not be anticipated to pose a health concern to workers on the Beloit Corporation property.

Under current and likely future Beloit Corporation property conditions, employees on the Beloit Corporation property were not anticipated to be exposed to groundwater containing VOCs. This is due to the fact that the wells used by the BCP draw water from below the VOC impacted aquifer. Future site use scenarios would also be expected to continue using

these wells. If for some reason, a well was placed in this shallow groundwater containing chlorinated VOCs, the level of health risk associated with groundwater consumption would likely be high (i.e., HI>1 and cancer risk greater than 10^{-4}). For this reason, shallow wells should not be installed within the contaminated zone of the aquifer on the Beloit Corporation property.

6.2.4 Construction Workers on the NPL Site

On the Beloit Corporation property, it was considered appropriate to assess the risks to construction workers, since the exposure for employees and construction workers could be much different. It was considered reasonable that during construction activities, surface and subsurface soils may be excavated, and that workers may be exposed to fugitive air emissions as a result of soil handling activities.

Construction workers on the Beloit Corporation property were assumed to contact and incidentally ingest surface and subsurface soil (0-10 ft) in areas of the excavation. In addition, the workers were assumed to inhale a conservatively high dust concentration (1 mg/m^3), which was assumed to have similar chemical concentrations as the soil. Because most soils that are excavated are moist enough to reduce dust generation appreciably, the 1 mg/m^3 dust concentration was assumed to be a conservative estimate. Further information on this estimate is given in Section 5.4.6. Based on the exposure assumptions used, it was estimated that no noncarcinogenic health effects would occur in construction workers exposed to the soil (HI<1). In addition, the cumulative cancer risk ($4x10^{-7}$), is below $1x10^{-6}$ (refer to Table D-11 in Appendix D). The major chemicals contributing to the total carcinogenic risks include benzo(a)pyrene and arsenic. Furthermore, as mentioned previously, for reference purposes, the health effects for exposure to soil at all depths were estimated. These risk estimates indicate noncarcinogenic health risk would not be expected (i.e. HI<1 and cancer risks are less than 10^{-4} (i.e., $2x10^{-5}$). The primary chemical contributing to the cancer risk estimate was benzo(a)pyrene. Results for this additional scenario can be found in Table D-12 of Appendix D.

6.2.5 Reasonably Maximally Exposed Population

Under the scenario where nearby residents are also recreational users of the Rock River near the BCP, and potentially trespass on the BCP, cumulative risk estimates were developed. These cumulative risk estimates are summarized on Table 6-1, and reflect the reasonable maximum level of exposure any one population could have considering exposure via multiple exposure pathways. Based on these cumulative (i.e., total risk) estimates), noncarcinogenic health risk would not be expected, since the hazard index was equal to one. The carcinogenic risks were within the acceptable risk limit for Superfund sites (i.e., $<1x10^{-4}$). Considering these risk estimates, and the conservative nature of the exposure assumptions used to derive the risks, the risk levels should be considered an upper limit.

6.3 RISK ASSOCIATED WITH HYPOTHETICAL FUTURE LAND USE CONDITIONS ON THE NPL SITE

The purpose of assessing risk under potential future land use conditions on the NPL Site is to determine if there are reasonable land use changes (e.g., residential development), which could lead to increased human exposure to contaminated media. If such changes appear possible, risks are also determined based on the potential future land use conditions. A risk assessment based on hypothetical future NPL Site and surrounding land use conditions will not be necessary, because the exposure pathways that currently exist reflect the exposure pathways that will likely exist under future conditions. In addition, levels of contamination should not increase in the future, but are actually decreasing.

Under current land use conditions, residents currently live on the NPL Site, and risk associated with exposure to groundwater in the Blackhawk Acres subdivision (i.e., quantitative assessment for a number of subgroups), soils on the Beloit Corporation property, and Rock River surface water and sediment have been addressed for these potential residents. Based on the operation of the Interim Source Control Action, concentrations in downgradient wells should not increase in the future. However, this is not to imply that there will not be naturally occurring fluctuations in the existing concentrations of chemicals in the groundwater. As the pump and treatment system reduces the source area, the concentrations of chemicals in groundwater will fall. This has been demonstrated with the groundwater monitoring that has been performed to date. In addition, the risks due to contact with soils on the Beloit Corporation property have been addressed for residents. In the future, the potential for nearby residences to be exposed to these media should not increase.

As mentioned in Section 4 of this report, the Rockton municipal well has not been impacted by the TCE plume to the south of the Beloit Corporation property. In the future, the well is not expected to be impacted based on the likely future pumping rate of the well and the hydrogeological conditions present. In addition, if a pond was made a part of the proposed development south of the NPL site, the pond will not be effected by the TCE in groundwater, because the depth to the chemically impacted groundwater is well below the depth of the proposed pond.

The only additional exposure pathway that could hypothetically be addressed under a future land use scenario is residential development of the Beloit Corporation property. However, based on the industrial zoning and historical record of industrial use, it is unlikely the Beloit Corporation property would be developed as a residential property. However, for informational purposes, the risks associated with a hypothetical resident located on the Beloit Corporation property using the shallow PCE impacted groundwater as a drinking water source are presented below.

PCE Plume - Central Beloit Corporation Property

Currently there are no residential wells on the Beloit Corporation property. The property is zoned commercial/industrial use, and property is supplied with groundwater from a deep well unaffected by the shallow chemically impacted groundwater. For information purposes, the risk associated with consuming the shallow contaminated groundwater was assessed. It was assumed for estimating the health risk estimates that the groundwater would be used for all domestic water uses (i.e., drinking and bathing), and that residents would use the water for 30 years. Based on these assumptions, noncarcinogenic health effects would be anticipated (HI>1; 50), and the cumulative cancer risk was equal to $7x10^{-3}$. Details on the specific noncarcinogenic and carcinogenic risks for each COPC in this scenario are given in Table D-1. Based on these risk calculations, consumption of the shallow groundwater on the Beloit Corporation Property may pose a health concern. For reasons described previously though, future consumption of this water is unlikely, and can be prevented through deed restrictions.

For the reasons stated above, the exposure pathways selected based on current NPL Site conditions should reasonably reflect the potential exposure pathways for residential receptors at the NPL Site in the future. However, the risks for hypothetical residential use of groundwater on the Beloit Corporation property, as presented above, were assessed for informational purposes.

6.4 SUMMARY OF HUMAN HEALTH RISK EVALUATION

This human health evaluation evaluated the potential exposures of human receptors to chemicals detected in media on or near the NPL site. Standard U.S. EPA methodologies were used to estimate levels of exposure and health risk by potentially exposed populations. The following section evaluates the potential ecological risk associated with the NPL site.

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7.0 SCREENING LEVEL ECOLOGICAL RISK ASSESSMENT

This section discusses the potential impacts to nonhuman receptors associated with exposures to the chemicals of potential concern at the NPL site. The format of this ecological risk assessment (ERA) is consistent with the following guidelines:

- Guidelines for Ecological Risk Assessment, U.S. EPA, April 1998
- Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments, USEPA, June 1997 (This document serves as the primary guidance for the development of the Ecological Risk Assessment.)
- Representative Sampling Guidance Document, Volume 3: Ecological, U.S. EPA, May 1997
- ECO Update, Intermittent Bulletins, U.S. EPA, 1991 to 1996

7.1 APPROACH AND SCOPE OF ASSESSMENT

The ERA follows the approach suggested in the more recent ecological risk assessment guidelines, which were previously summarized (EPA 1997 and 1998). In addition, the ERA conforms to the scope that was outlined in a letter dated April 27, 1999 prepared by Montgomery Watson and submitted to the IEPA.

Ecological assessments are conducted using a tiered approach where the complexity of the assessment increases with each successive tier. Each tier consists of a problem formulation step, an analysis step (consisting of an exposure assessment and stressor assessment), and risk characterization.

This ecological assessment is limited to a screening level assessment. A screening level ecological assessment was conducted for the site based on current U.S. EPA guidance (U.S. EPA 1997 and 1998). The screening level ERA, or Tier 1 ERA, is a conservative preliminary assessment. The assessment is designed so that exposure pathways that have the potential to pose ecological risks are not screened from further evaluation. Because of the conservative nature of the screening level ERA, the results are not sufficient to support remediation by themselves. The purpose of the screening level ERA is to determine whether there is a need for further assessment, or support the decision that there are no completed pathways that pose significant risk to receptors. This screening level ERA was composed of the following three steps:

1. Preliminary Problem Formulation
2. Screening Analyses
3. Risk Characterization

This assessment started with a problem formulation stage to determine the assessment endpoints and measurement endpoints. Once the assessment and measurement endpoints were determined, then the analysis was performed. The analysis consisted of comparing the level of ecological receptor exposure (through the use of sediment and soil data), and screening levels of ecological receptor exposure (toxicity benchmarks). Finally the data from the analysis steps were combined to characterize the risk (i.e., risk characterization).

A conservative approach was taken throughout this screening assessment so that an obvious indication could be made whether the site poses little or no ecological risk. If the conclusion of this screening assessment clearly demonstrates that no risk exists, then no additional assessment is warranted. However, if there is not a clear conclusion of no risk, additional tiers of data collection and analysis may need to be performed to refine the preliminary screening ecological assessment, and determine if ecological risks are likely. Additional assessment tiers may include conducting more complex fate and transport modeling, bioassays, or field studies to determine if ecological effects are likely.

7.2 PROBLEM FORMULATION

The ecological assessment started with a problem formulation stage. The main focus of the problem formulation stage was to determine the assessment endpoints and measurement endpoints. The assessment endpoints are the goals that are to be achieved with the assessment. For this screening assessment, the assessment endpoint that has been chosen is to determine whether ecological habitats on the site may pose an ecological concern to ecological receptors. The measurement endpoints are the measures that will be used to determine if the assessment endpoint is being achieved. For this assessment, the measurement endpoints are a direct comparison of medium concentrations in areas of the site that afford wildlife habitat to screening level benchmark values (to be explained latter). In addition, within the problem formulation section an identification of chemicals of ecological concern is made, and an initial exposure assessment, which includes identification of potential receptor species, and identification of potential exposure pathways is conducted. Information from this step was used during the analysis step of the screening ERA, which describe site-specific exposures and toxic ecological effects. The following is a more detailed discussion of these three main components of the Problem Formulation that included:

1. Habitat Assessment/ Identification of Receptors
2. Identification of Chemicals of Potential Ecological Concern (COPECs)
3. Identification of Exposure Pathways

7.2.1 Habitat Assessment/Identification of Receptors

A habitat assessment of the NPL Site was conducted on September 16, 1999 to identify habitats, and potential ecological receptors. In addition, the Rock River was surveyed east of the dam in the Village of Rockton south of the NPL Site. Montgomery Watson's field biologists were accompanied by Ecology and Environment, Inc. (E&E), and Beloit Corporation staff. Montgomery Watson performed a walkover survey of the site to identify dominant vegetation communities and wildlife habitats. A survey by canoe was also conducted along the Rock River to investigate the aquatic and wetland ecosystems on the west side of the Beloit Corporation property. In addition to looking for protected species, field observations of suitable habitat for federal or state-listed threatened and endangered species were also performed. Based on the field survey and a literature review, the four major vegetation communities which were investigated during the RI that could provide habitat for wildlife on the site are:

- The floodplain forest community on the western edge of the Beloit Corporation property
- Rock River backwater areas
- A ruderal prairie community on the FSSA
- Cottonwood-willow complex communities at the FSDA, gravel pit, and abandoned wastewater impoundment

Of these areas, the highest valued habitat is provided by the floodplain forest community and Rock River backwater areas, while the ruderal prairie and cottonwood-willow complexes are disturbed, low quality habitats. The following is a more detailed description of the results of the habitat assessment.

7.2.1.1 Vegetation Communities. Most of the unoccupied land (approximately 125 acres) on the NPL site occurs on the approximately 200-acre Beloit Corporation property. In addition to the main buildings, (the BCP and BCRC), the property contains the FSSA, the FSDA as well as an inactive gravel pit and abandoned wastewater impoundment. With the cessation of activities several years ago, vegetation communities have colonized these disturbed areas.

A ruderal prairie community has revegetated the FSSA at the south end of the property. Cottonwood-willow complexes now grow on the FSDA, abandoned wastewater impoundment, and within the gravel pit. In addition to these disturbed plant communities, the western portion of the property adjacent to the Rock River (approximately 86 acres) supports a floodplain forest community and shallow backwater areas with wetland sloughs. Figure 7-1 shows the approximate location of dominant vegetation communities on the Beloit Corporation property. The following is a description of each community.

Floodplain Forest (Community FF)

Flora

The dominant vegetation community on the property is the floodplain forest community (Community FF) that is seasonally flooded each spring. This community includes a diversity of hardwoods including oaks, ashes, maples, and elm. Water-tolerant trees such as red maple (*Acer rubrum*), green ash (*Fraxinus pennslyvanicum*), and black willow (*Salix nigra*) dominate the riverfront (see Photograph 1 and 2 within Appendix E). At higher elevations landward of the river, Northern red oak (*Quercus rubra*), white oak (*Quercus alba*) and black oak (*Quercus velutina*) grow among black ash (*Fraxinus nigra*), sugar maple (*Acer saccharum*) and American elm (*Ulmus americana*). Summer linden (*Tilia platyphyllos*) and Eastern hornbeam (*Ostraya virginiana*) are codominate plant species in the northwest corner of the forest (Community FF1). Immense black walnuts (*Juglans nigra*) and red oaks dominate the wooded area just west of the FSDA (Community FF2). Honey locust (*Gleditsia tricanthos*) and ashleaf maple (*Acer negundo*) grow in more open areas along the edge of the woods). Typical understory shrubs, groundcovers, and vines include hawthorns (*Craetaegus* spp.), black cherry (*Prunus serotina*), chokecherry (*Prunus virginica*), poison ivy (*Rhus toxicodendron*), white snakeroot (*Eupatorium rugosum*), wild grape (*Vitis* spp.), and Virginia creeper (*Parthenocissus quinquefolia*).

Fauna

The floodplain forest community provides high-quality habitat for terrestrial and wetland-dependent species. Seasonal flooding of low depressions within the floodplain also provides temporary wetland habitat for resident floodplain species and visitors from adjacent uplands.

The moist broadleaf forest with large, mast-producing trees is attractive to a variety of wildlife including birds, mammals, reptiles, and amphibians. The huge trees provide leafy canopies for nesting, large crops of seeds and nuts, and trunks riddled with nesting cavities and bark insects.

Typical mammals include mice, raccoon, opossum, groundhog, grey squirrel, gray fox, and white-tail deer. Several underground dens were seen during the field survey. Avifauna include barred owl, wild turkey, hawks, and several species of woodpeckers. The leaves and berries of understory species are eaten by insectivorous birds such as flycatchers, gnatcatchers, and warblers. The dense forest litter also provides food and shelter for amphibians, reptiles, and small rodents. Field observations including tracks, trails, droppings, feathers, and direct sightings indicated the presence of white-tail deer (*Odocoileus virginianus*), wild turkey (*Melagris gallopavo*), and red-bellied woodpecker (*Melanerpes carolinus*).

Rock River and Backwater Areas (Community RR)

Flora

The Rock River and backwater areas include the shallow lake and finger-shaped wetland sloughs that extend into the floodplain forest (see Photographs 3, 4, and 5 within Appendix E). Flow in the main river channel prevents the establishment of aquatic macrophytes on the steep eroded banks within the property boundaries (see Photograph 6 within Appendix E). Shallow backwater areas approximately two feet deep contain phytoplankton (filamentatous green algae) as well as emergent, submergent, and floating macrophytes such as blueflag (*Iris versicolor*), arrowroot (*Sagittaria latifolia*), duckweed (*Lemna minor*), swamp smartweed (*Polygonum hydropiperoides*), and knotty pondweed (*Potamogeton nodosus*). The flora around the Rock River east of the hydroelectric plant (see Photograph 7 within Appendix E), included maidencane (*Panicum hemitomon*), cocklebur (*Xanthium strumarium*), smartweed (*Polygonum pennsylvanicum*), nutgrass (*Cyperus esculentes*) and curly dock (*Rumex crispus*) comprise the shoreline vegetation in depositional areas.

Fauna

The riverine and backwater ecosystem provide diverse habitat for aquatic fauna such as zooplankton, fish, and benthic invertebrates in addition to water-dependent birds, mammals, amphibians, and reptiles. Terrestrial species from adjacent upland habitat forage these areas for food and water. Water-tolerant trees and shrubs provide nesting cover for songbirds and colony nesting birds such as herons and cormorants. Two great blue herons (*Ardea herodias*) were seen flying along the river during the field investigation. Dead tree limbs provide riverside hunting perches for piscivorous birds such as belted kingfisher (*Ceryle alcyon*) and osprey (*Pandion haliaetus*) which were seen during the field survey. Tree snags create important habitat for hollow tree nesters including wood ducks, owls, and woodpeckers. Field indications of beaver (*Castor canadensis*), a resident mammalian species, included cut trees and a belly slide on the muddy riverbank.

Highly variable habitat cover in the backwater areas includes submerged tree stumps and limbs, emergent and submergent macrophytes, and root wads of fallen trees. The still backwater areas provide important reproductive habitat for several fish species and breeding grounds for amphibians. Several carp were seen in the shallow open water area during the field survey.

Vegetative cover in the marsh sloughs provide protected feeding areas for turtles, frogs, and waterbirds. The muddy sediments offer good burrowing habitat for worms and mussels. Open mussel shells were found along the riverfront east of the hydroelectric dam.

Cottonwood-Willow Complex (Community CW)

Flora

Cottonwood-willow complexes occur in the former gravel pit (Community CW1), clarifying pond (Community CW2), and foundry sand disposal area (FSDA-Community

CW3). As shown in Photograph 8 within Appendix E, the uneven sand mounds in the FSDA trap rainwater in isolated depressions which fosters the growth of cottonwood trees (*Populus deltoides*) and black willow *shrubs (Salix nigra*) among ruderal plant species such as common ragweed (Ambrosia artemissifolia), tall goldenrod (*Solidago altissima*), and horseweed (*Erigeron canadensis*). The former clarifying pond contains the densest stand of cottonwood-willow with little herbaceous cover (see Photograph 9 within Appendix E). Cattails (*Typha latifolia*), smartweed (*Polygonum pennsylvanicum*), and water plantain (*Alisma triviale*) form a sparse herbaceous layer in the isolated water-filled depressions of the excavated gravel pit (see Photograph 10 within Appendix E). The upper, rocky portion of the gravel pit contains patches of ruderal vegetation similar to the FSDA species.

Fauna

The cottonwood-willow plant communities in disturbed areas on the property provide variable habitat quality. The highly disturbed FSDA has low habitat value for terrestrial wildlife. Vegetated areas in the gravel pit could provide cover and foraging habitat for birds and small mammals. The former clarifying pond is the least disturbed area and offers suitable habitat for terrestrial and aquatic species such as birds, deer, and beaver. The relatively remote riverside location of the clarifying pond enhances the wildlife habitat value of this plant community. In addition to several gnawed trees, a belly slide in the adjacent riverbank indicated habitat use by beavers or possibly river otters.

Ruderal Prairie (Community RP)

Flora

A ruderal prairie community dominated by hardy perennials and grasses has been established at the former FSSA and adjacent open fields (see Photographs 12 and 13 within Appendix E). Common grasses and weeds including bluegrasses (*Poa* spp), brome grass (*Bromus* sp.), tall goldenrod (*Solidago altissima*), ragweed *(Ambrosia artemissifolia*), horsetail (*Erigeron canadensis*), cow parsnip (*Heracleum lanatum*), white milkweed (*Asclepias variegata*), and smooth sumac (*Rhus glabra*) comprise this pioneer plant community. A few small elm trees have invaded the herbaceous cover, especially near the forest edge to the west.

Fauna

Despite its disturbed nature, this terrestrial ecosystem provides some wildlife habitat, primarily on its western edge (see Photograph 13 within Appendix E). The edge community (Community RP1) where the prairie meets the forest typically supports birds and mammals that depend on both forest and open areas to meet habitat requirements for food and shelter. Herbivorous mammals such as rabbits and white-tail deer may graze or rest in the vegetation near the woods. Deer droppings and a sunny day bed for resting were found in the edge habitat during the field survey. The grasses and flowering plants attract insects, birds, and rodents such as voles and mice that eat plant seeds. In addition to turkey vultures, aerial predators such as hawks and owls could hunt for prey in this open habitat.

Wetlands

As shown on Figure 7-2, the 1999 U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Map identifies the western portion of the NPL site near the Rock River as potential wetlands. USFWS wetland classifications on NWI Maps are based on *Classifications of Wetlands and Deepwater Habitats of the United States*. Wetland classifications in the floodplain forested community on the NPL site include seasonally and temporarily floooded, palustrine, broad-leaved deciduous forest. The Rock River is classified as riverine, unconsolidated bottom, permanently flooded deepwater habitat. Backwater areas are classified as palustrine, unconsolidated bottom, intermittently exposed wetlands. The cottonwood-willow complex in the clarifying pond is shown as Other. The remaining vegetation communities on the NPL site are classified as uplands.

Although potential wetlands were observed during the field survey of vegetation communities, no attempt was made to verify wetland classifications shown on the NWI Map. NWI Maps are not intended for use in determining wetland jurisdictional boundaries since they are prepared from high altitude aerial photography that has not been ground-truthed. A wetland jurisdictional delineation must be conducted to positively identify wetlands within the floodplain forest and backwater areas as well as other vegetation communities on the NPL site.

7.2.1.2 Threatened and Endangered Species. An osprey (*Pandion haliaetus*), a state-protected species, was seen flying over the Rock River during the preliminary field investigation. The Blackhawk Facility site may contain potential habitat for the osprey or other protected species. The Illinois Department of Natural Resources (IDNR) and United States Fish and Wildlife Service (USFWS) have been contacted for a list of protected species that are known to occur in the site vicinity. Responses to these inquiries are provided in Appendix G. The USFWS noted that the threatened bald eagle, and prairie bush clover are located in the general site area. The IDNR indicated that there is a known occurrence of the state-listed plants kitten tailsand Dragon wormwood near the NPL Site. None of these particular species have been observed on the NPL site, but no detailed biological survey has been completed to date that could definitely verify that these particular species are not present.

7.2.2 Identification of Chemicals of Potential Ecological Concern (COPECs)

The chemicals of concern identified in the human health risk assessment (Sections 5) were used to represent the chemicals of potential ecological concern (COPECs) for the screening level ecological assessment. As in the HHE, no analytes were eliminated, except the nutrient metals (i.e., calcium, magnesium, potassium, and sodium). The data from the RI was culled to include only data from those areas on the NPL site, which could be utilized as ecological habitat. Therefore, data in areas of the Facility, or soil samples collected under pavement were not considered in the screening level ecological assessment. In addition, the data used for the ecological assessment was limited to the surficial soils, which most biological receptors would have potential exposure to.

The concentrations of COPECs detected in sediment are presented in Table 7-1. In sediments very few VOCs, were detected. In a few samples polycyclic aromatic hydrocarbons (PAHs) were detected, but other SVOCs were not generally detected in sediments. Metals were the primary analytes detected in sediments.

The concentrations of individual COPECs detected in surface soil are presented in Tables 7-2 through 7-5. The chemical characteristics of the soils were very similar to the sediments. However, very low concentrations of polychlorinated biphenyl's (PCBs) were also detected in select surface soil samples.

It should be noted that in the human health risk assessment, COPCs had been selected for Rock River surface water, based on the chemicals detected in local groundwater. However, based on the fate and transport analysis conducted, which is described in Section 5.3.1 of the RI report (Montgomery Watson 1999), the dilutional effects of the Rock River upon any impacted groundwater discharged to it were estimated to reduce the concentrations of COPCs below levels of detection or concern. For this reason, Rock River surface water was not considered further in this screening level ERA.

7.2.3 Identification of Exposure Pathways/Conceptual Site Model

The objective of this section is to use the information gathered on concerning ecological habitats, and chemical characteristics within each habitat, to defined potential exposure pathways for ecological receptors. For purposes of this screening level ecological assessment, the receptors of primary concern were those that would have direct contact with the sediment or surface soil. While a variety of wetland or upland dependant receptors could be selected (as described in the habitat assessment), for purposes of the screening level ERA only general classes of receptors were selected, because the analysis performed in a screening level ERA is not typically species specific.

For the wetlands habitat, sediment associated biota were selected as the receptors of primary concern. These would include such organisms as amphibians, invertebrates, and wetland plants.

For the terrestrial habitats, plant and soil associated invertebrates were selected as the receptors of primary concern. These would include any threatened or endangered plant species, and such soil invertebrates as earthworms.

The potential for general bioaccumulation to higher trophic levels is considered unlikely based on the nature of the contaminants, their frequency of detection, and/or the concentration of the contaminants. While bioaccumulative chemicals, such as PCBs, cadmium, and mercury were detected in site soils, these chemicals were detected at low concentrations, as compared to Oak Ridge National Laboratory (ORNL) *Preliminary Remediation Goals For Ecological Endpoints*.

Ecological preliminary remediation goals (PRGs) are medium-specific values based on toxicity benchmarks developed for a suite of ecological receptors (plants, soil invertebrates [earthworms], and wildlife). These values account for exposure to soil via incidental ingestion, dermal absorption, and dust inhalation, in sensitive ecological receptors. In particular, wildlife PRGs are based on six receptors: the short-tailed shrew (*Blarina brevicauda*), white-footed mouse (*Peromyscus leucopus*), red fox (*Vulpes vulpes*), white-tailed deer (*Odocoileus virginianus*), American woodcock (*Scolopax minor*), and red-tailed hawk (*Buteo jamaicensis*). These species encompass a variety of different behaviors and diets. For each constituent, the lowest protective concentration from among these receptors was selected as the PRG. For example, the PRG for arsenic is based on the soil NOAEL concentration for the shrew, which was the most sensitive species for which data were available.

Wildlife PRGs consider the potential for bioaccumulation and bioconcentration of COPECs by two means. First, PRGs consider the ingestion of both food and soil, conservatively assuming that 100% of the diet comes from contaminated habitat. Secondly, the potential for magnification of contaminant levels through the food-chain is addressed through the use of dietary uptake modeling from consumption of contaminated plants, earthworms, and small mammals.

Cadmium was detected in only one sample exceeding the PRG of 4 mg/kg; and PCBs were not detected in any of these surface soil samples at concentrations which exceed the PRG of 0.371 mg/kg. All mercury detections (as well as the sample quantitation limit for all samples) were above the mercury PRG of 0.00051 mg/kg. However, the PRG document acknowledges that this concentration is within the range of background concentrations, and furthermore, the PRG was based on a study of methyl mercury dicyandiamide. This form of mercury is not expected to be present at the site.

7.3 ANALYSIS (EXPOSURE ASSESSMENT AND TOXICITY/STRESSOR ASSESSMENT)

While the Problem Formulation step is mainly qualitative in nature, the Analysis involves quantifying those factors that determine whether a COPEC poses an ecological concern. According to current EPA guidance, the Analysis step of an ERA consists of an assessment of the magnitude of potential exposure to COPECs, and an assessment of the toxicity of these stressors and other nonchemical stressors. The Analysis uses information from the Problem Formulation (e.g., Conceptual Site Model) to determine an appropriate quantitative approach to define levels of COPEC exposure and toxicity. For purposes of this screening level ecological assessment, the concentration of each COPEC detected within sediment and soil are used to define quantitatively the potential level of chemical exposure that ecological receptors may have. To estimate the toxicity of each chemical to sediment and soil associated biota, toxicity benchmarks were obtained from the following sources:

- U.S. Department of Energy, 1997. *Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates.*

- U.S. Department of Energy, 1997b. *Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Terrestrial Plants.*

- U.S. Department of Energy, 1997c. *Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Sediment-Associated Biota.*

- U.S. Department of Energy, 1997d. *Preliminary Remediation Goals for Ecological Endpoints.*

Sediment COPECs and their respective toxicity benchmarks are summarized in Table 7-1. The toxicity benchmarks available for sediment are generally developed to protect aquatic life using what data is available on plant, invertebrate, and fish species toxicology. However, it should be noted that the methods used are generally conservative, and aim to protect even the most sensitive aquatic receptors.

Soil COPECs and their respective toxicity benchmarks are summarized in Table 7-2 through 7-5. The soil criterion selected were those for protection of earthworms because they are generally the most sensitive to the COPECs.

7.4 RISK CHARACTERIZATION

Risk characterization is the integration of the exposure into a quantitative characterization of risk posed by the COPECs to the ecological receptors of concern (i.e., sediment or soil associated biota). The site-specific chemical data was used to estimate the potential exposure point concentration of each COPEC.

Chemical exposure can lead to either noncarcinogenic health effects and/or carcinogenic health effects. For purposes of this ERA, only noncarcinogenic health effects were assessed. Cancer is generally an endpoint that occurs only after a chronic period of chemical exposure, and an extended latency period. For this reason, in the environment with the normal predator-prey relationships, most animal species do not live long enough for cancer to manifest itself. In addition, the incidence of chemically induced cancer cases in a species population would likely be insignificant, and not impact the overall population dynamics of the species.

Potential risks associated with noncarcinogenic effects of chemicals were calculated by means of a hazard index technique as recommended by U.S. EPA (1989). For noncarcinogenic chemical exposures, the ratio of the chemical concentration to the toxicity benchmark for the COPEC is used to assess the potential for health concerns. Values of these ratios, called hazard quotients (HQs), that are greater than 1 are indicative of a potential for adverse health effects to the receptors of concern. The effects from

simultaneous exposures to all chemicals of potential concern were computed by summing the individual ratios (HQs) within each exposure pathway. This sum, known as the hazard index (HI), serves the same function for the mixture as the HQ does for the individual compound. In general, HIs that are less than 1 are not likely to be associated with health risks for the receptors of concern and, are therefore, less likely to be of regulatory concern than hazard indices greater than 1. It should be noted that HQs are not necessarily additive (such as for chemicals that affect different target organs or have different modes of action), and therefore in some cases the approach taken in this report (summing HQs) is overly conservative. The following is a summary of the calculated HQs and HIs for the sediment and soil associated biota. The evaluation of the significance of the HQ and HI values is conducted in a manner consistent with Menzie et al. (1992), as follows:

- HQ or HI less than 1: no adverse effects on ecological receptors is anticipated.
- HQ or HI between 1 and 10: there is limited potential for adverse effects on ecological receptors.
- HQ or HI between 10 and 100: there is potential for adverse effects on ecological receptors.
- HQ or HI exceeds 100: there is significant potential for adverse effects on ecological receptors.

The ecological risk associated with each medium is presented below.

7.4.1 Sediment Associated Biota

Within the Rock River, sediment analyte concentrations are generally lower than the toxicity benchmarks with a few exceptions. In general, sediment sample SD07 had concentrations of total PAHs, and a number of metals well above the toxicity benchmarks for sediment associated biota (i.e., HQ > 100). However, this sample location is hydrologically up stream of the surface water runoff from much of the Beloit Corporation Facility. The source of the contamination at this location is not known.

With the exception of this single location (i.e., SD07), other sediment locations had levels of PAHs and metals, which were below the toxicity benchmarks or are just slightly in exceedance of the benchmark (i.e., HQ slightly > 1). The primary analytes slightly in exceedance of the toxicity benchmarks were cadmium, and manganese. However, because the analyte concentrations are below or only slightly above the toxicity benchmark, there would be very limited potential for adverse effects on sediment associated biota.

Based on these results, further ecological risk assessment would not appear to be warranted for the sediment-associated biota. It should be noted too, that during the site walkover that the wetland habitats where some of the sediment samples had been collected (SD05 and SD06) appeared to be very healthy with a wide diversity of wetland plants growing.

7.4.2 Soil Associated Biota

Soil associated invertebrate toxicity benchmarks and plant toxicity benchmarks were compared to the analyte concentrations detected in the terrestrial habitats on the Beloit Corporation property. No sampling was conducted in the forest floodplain habitat, which contains the champion oak and walnut trees, and prime wildlife habitat. Rather, the RI focussed on disturbed areas on the site, where disposal was known to have occurred or potentially have occurred. These included:

- The ruderal prairie community on the FSSA
- The Cottonwood-willow complex communities at the FSDA, gravel pit, and abandoned wastewater impoundment

Each of these areas provides habitat for upland game species. However, the quality of the habitat is low, and not unique in any way. Based on a comparison to the available toxicity benchmarks, the concentrations of the VOCs, SVOC, and PCBs detected in these disturbed areas would not be expected to pose a health concern. In each case the analyte concentration was lower than the toxicity benchmark.

A select number of samples had metal concentrations which exceeded their toxicity benchmarks for soil-associated invertebrates or plants. These included aluminum, antimony, cadmium, chromium, copper, manganese, mercury, nickel, selenium, silver, vanadium, and zinc. However, for each of these metals (with the exception of aluminum, chromium, manganese, mercury, selenium, and zinc), exceedances of the benchmarks were isolated and infrequent among the applicable soil samples. It is important to note though that for aluminum, chromium, manganese, mercury, selenium, and zinc, the toxicity benchmark concentrations are lower than the TACO background soil concentrations. Furthermore, only two samples exceeded the TACO background concentration for aluminum (9,500 mg/kg), only two samples exceeded the background concentration for chromium (16.2 mg/kg), only four samples exceeded the background concentration for manganese (636 mg/kg), only five samples exceeded the background concentration for mercury (0.06 mg/kg), only three samples exceeded the background concentration for selenium (0.48 mg/kg), and only one sample exceeded the background for zinc (95.0 mg/kg). Also, similar to the other elevated metal detects, these samples with background exceedances are not all located in adjacent samples, but rather these samples were located on various portions of the site. Taking all of this information into account, there is a limited potential for soil-associated biota to be adversely effected. In certain cases (i.e., aluminum, copper, chromium, and mercury) where the plant toxicity benchmarks were greatly exceeded (i.e., HQ > 10), it is known that plants can normally grow in soils with the range of metal concentrations that were detected. In addition, in the case of copper only a single sample in the Foundry Sand Disposal Area exceeded the toxicity benchmark. The next highest copper concentration (14 mg/kg) was well within background and below the toxicity benchmark limits. As stated above, the mercury PRG is

based on a study of methyl mercury dicyanodiamide, which is not a form of mercury expected to have been released at the site. The confidence in these toxicity benchmarks was rated as low and probably do not represent reasonable toxicity benchmarks, especially since many of the benchmarks are significantly lower than IEPA approved soil background concentrations.

It should be noted that the terrestrial habitats on the Beloit Corporation property looked healthy, and no areas of stressed vegetation were observed. The plant communities appeared to have a wide diversity of plants and animals using them including higher trophic level carnivores, such as fox or coyotes based on observations of scat and burrows.

In addition, because of the nature and concentration of the analytes detected in the terrestrial habitats, bioaccumulation and biomagnification through the food chain would not be expected to pose a concern. This is described in further detail in Section 7.2.3, above.

Based on this screening level assessment, further ecological risk assessment for the terrestrial habitats do not appear warranted.

7.4.3 Summary of Ecological Health Risks

Based on the results of the screening level ecological assessment, levels of analytes detected in wetland and terrestrial habitats would not be expected to pose a health concern to ecological receptors. For this reason, additional ecological risk assessment was not considered necessary for purposes of this BlRA.

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8.0 DISCUSSION OF UNCERTAINTIES

The health risk estimates are calculated using the best scientific information available, but each factor used to generate the risk estimates has some level of uncertainty associated with it. In addition, for certain risk assessment factors there is no readily available information, and therefore, professional judgment and site information must be used to estimate these values. The level of uncertainty associated with values based on professional judgment are less well known. For these reasons, a conservative approach is used so as not to underestimate human health risks. For this reason, the health risk estimates should be conservatively high compared to the "true" level of health risk likely associated with the NPL Site.

The following is a summary of some of the assumptions and uncertainty factors applied in the human health and ecological components of the risk assessment, as well as indications of their resulting biases.

- It was assumed that interim measures taken to limit the potential for groundwater exposure would continue into the future, thus reducing associated health risks. These include:

    - The IEPA's point-of-entry treatment systems.
    - The groundwater pump and treatment system.

- It was assumed the exposure scenarios selected for this assessment (i.e., residential, employee, and construction workers) would adequately reflect the risk associated with the NPL Site under current and future conditions. This is a reasonable assumption, as long as in the future the land use in areas where impacted media occur do not dramatically change in a way that would increase human exposure to the media. Based on current zoning and land use practices, major changes from industrial land use to residential land use do not seem likely. However, it should be noted though that hypothetical risk associated with consuming the shallow groundwater have been provided for informational purposes in this risk assessment in the event that such a land use change was proposed by some third party.

- It was assumed that the NPL Site is adequately characterized. The presence of areas of contamination not identified may result in an underestimation of NPL Site risks. The NPL Site has been well characterized with regard to the nature and extent of contamination.

- Sample quantitation limits for heptachlor range from 0.047 to 0.050 ug/L, whereas the U.S. EPA Region III risk-based concentration (RBC) for tap water was 0.0023 ug/L. This is a limitation of analytical technology, and thus, there could be heptachlor present above the RBC that has been undetected. The only

detection of heptachlor was on the plant facility grounds, in an area where groundwater exposure pathways are incomplete.

- It was assumed that the identified chemicals with toxicity factors (including ecological toxicity benchmarks) are associated with the majority of NPL Site health risks. The presence of highly toxic compounds not analyzed for, or compounds for which little toxicity information exists, may result in an underestimation of NPL Site risks. For each compound detected on the NPL Site, there was one or more U.S. EPA identified toxicity factor to address human health risks. In regards to the screening level ecological assessment, some of the analytes did not have toxicity benchmark values to assess their ecotoxicology. This is a common shortcoming of most ecological assessment, and is due to the limited data available on ecological risks for many analytes. However, most analytes detected on the NPL Site and not having toxicity benchmarks were generally associated with classes of chemicals (i.e., VOCs and micronutrient elements) that are not normally thought to present an ecological concern, because they are low in toxicity and/or readily metabolized and not biomagnified. Therefore, uncertainties associated with not addressing the toxicity of each compound have been minimized within both the human health and ecological assessment.

- Slope factors are derived by EPA in an intentionally conservative way, that is, the actual risk is not expected to exceed the predicted risk, and could be considerably lower. Cancer risks calculated using these conservative slope factors and reasonable maximum exposure estimates are upper bound estimates of excess cancer risk potentially arising from exposure to the chemicals in question. A number of assumptions have been made in the derivation of these values, many of which are likely to overestimate exposure and toxicity. The actual incidence of excess cancers is likely to be lower than these estimates and may be zero.

- Lifetime daily intakes, using an averaging time of up to 70 years, effectively prorates the total cumulative dose over a lifetime. This approach is based on the assumption for carcinogens that a high dose received over a short period of time at any age is equivalent to a corresponding low dose received over a lifetime (U.S. EPA 1989a). This assumption is unlikely to be true for all carcinogens, and introduces uncertainty into the assessment of potential risk. This assumption may also lead to an overestimate or underestimate of potential risk, depending upon the actual timing of exposure and the mechanism of action of individual carcinogens.

- The human toxicity values may overestimate risk. Reference doses incorporate maximum levels of conservative uncertainty factors, and cancer slope factors estimate upper bound 95th percentile values.

- Risks within an exposure route are assumed to be additive. This may result in an over- or underestimation of risk, because using this approach does not take into

account potentiation, antagonistic or synergistic interactions. At this time, data are not available to determine whether the chemicals of potential concern would cause potentiation, antagonistic or synergistic effects on one another.

- Critical toxicity values derived primarily from animal studies may over- or underestimate human health risk. There is a fundamental uncertainty in extrapolating animal toxicity data to humans. Several factors may introduce the uncertainty, including differences in species' chemical absorption characteristics, pharmacokinetics, target organ sensitivity, etc. However, a conservative approach has been used by the U.S. EPA to develop the toxicity values so that the human toxicity of a chemical is not underestimated.

- Human behavioral patterns cannot be predicted with certainty. However, reasonable maximum levels of exposure were assumed, therefore, the actual levels of exposure and health risk has probably been overestimated. The exception to this is with the modeling of indoor air exposures associated with domestic water use. Based on McKone (1989) the amount of inhalation exposure from all domestic water uses may be slightly greater than if the showering is considered the sole inhalation source. However, based on this information, the differences in exposure and risk would be only slightly greater (less than double).

- Species sensitivity to chemicals varies greatly, and therefore, the risks can be minimize if the proper ecological receptors are not selected. For example it is not known if any of the T&E species listed in Appendix G are present on the NPL Site. In the case of the screening level ecological assessment, conservative toxicity benchmarks have been selected that should protect even sensitive species, because of how the benchmarks were developed. For this reason, this limitation has been minimized using this approach.

- It was assumed that the media concentrations would remain constant over time. This assumption results in a probable overestimation of health risks, since based on temporal data presented in the RI, the concentrations of COPCs are being reduced in groundwater. It should be noted that the estimated surface water chemical concentrations in the Rock River south of the Village of Rockton are based on the conservative assumption that the concentrations of analytes detected in monitoring wells upgradient of the River actually migrate to the River in the future.

9.0 SUMMARY AND CONCLUSIONS

This Baseline Risk Assessment (BlRA) explored the potential human health and ecological risks resulting from exposures to chemicals detected during the RI activities conducted at and in the area of the NPL Site. Potential human health risks were assessed for those populations that may have the potential for exposure to the NPL Site (i.e., nearby residents, employees, and construction workers). In addition, potential ecological risks were assessed for select ecological receptor groups. For each potentially exposed population, the ways that they may be exposed to impacted media were assessed; these are referred to as exposure pathways. The following is a summary of the results of the Human Health Evaluation (HHE) and Screening Level Ecological Assessment (ERA), which together make-up the BlRA.

9.1 SUMMARY OF HUMAN HEALTH EVALUATION (HHE)

Based on the results of the RI, a set of chemicals of potential concern were selected by media. Within the HHE, the potential for exposure to the chemicals of potential concern were assessed for humans. In summary, the exposure pathways that were evaluated under current land use conditions and potential future land use conditions by receptor are summarized below. It should be noted that some exposure pathways are potentially complete under present site conditions, whereas a number of the exposure pathways are potentially complete under potential future site conditions. The distinction is summarized below.

Potentially Complete Exposure Pathways under Current Land Use - Present Conditions – the following are the exposure pathways that are considered to be complete under present conditions and current land use on the NPL Site.

Residents

- Use of groundwater from a private well from one of the following areas (quantitative assessment).

  ⇒ Northern Blackhawk Acres Subdivision Wells - No point-of-entry treatment systems, with concentrations of analytes below Federal drinking water standards.

  ⇒ Other Blackhawk Acres Subdivision Wells – No point-of-entry treatment systems, with concentrations of analytes below Federal drinking water standards.

- Incidental ingestion and dermal absorption of chemicals from surface water by children swimming in the Rock River at the point of groundwater discharge located south of the Village of Rockton and off the NPL site.

- Incidental ingestion and dermal contact with sediment by children playing along the banks of the Rock River adjacent to the Beloit Corporation property.

- Incidental ingestion and dermal contact with surface soil by children trespassing on the Beloit Corporation property.

Employees

- Use of groundwater from a well on the Beloit Corporation property (qualitative only).

- Incidental ingestion and dermal contact with surface soil, and inhalation of fugitive dust by employees working in areas of exposed soils.

Construction Workers

- Incidental ingestion and dermal contact with surface and subsurface soils by construction workers digging in soils on the Beloit Corporation property.

- Inhalation of fugitive dusts and volatile vapors generated during digging activities.

Potentially Complete Exposure Pathways under Current Land Use - Potential Hypothetical Future Conditions – the following are the exposure pathways that are considered to be potentially complete under hypothetical future conditions and current land use on the NPL Site.

Residents

- Use of groundwater from a private well from one of the following areas (quantitative assessment).

  ⇒ TCE Plume – Southern Wells South of the Beloit Corporation Property (Village of Rockton) – Hypothetical if one or more of the nine private wells in the Village of Rockton, which were never hooked up to the Village's municipal water supply, were impacted in the future

  ⇒ Southern Blackhawk Acres Subdivision Wells – Hypothetical as if the point-of-entry systems were not in operation

⇒ Eastern Blackhawk Acres Subdivision Wells – Hypothetical as if the point-of-entry systems were not in operation

Employees

- Incidental ingestion and dermal contact with surface soil, and inhalation of fugitive dust by future employees working in areas of exposed soils.

- Incidental ingestion and dermal contact with surface soil, and inhalation of construction-related dust by future employees working in areas of construction work.

Potentially Complete Exposure Pathways under Future Land Use Conditions - The exposure pathways presented above were also considered to adequately reflect the potential exposure pathways that may occur on the NPL Site in the future. However, for informational purposes, the risks associated with a hypothetical resident located on the Beloit Corporation property using the shallow PCE impacted groundwater as a drinking water source were assessed.

The potential level of exposure was estimated for each of the subpopulations described above by media. The potential levels of exposure were compared to U.S. EPA approved estimates of the toxicity of each of the chemicals of potential concern to estimate health risks. The following is the summary of these results and the conclusions of the HHE.

9.2 SUMMARY OF RESULTS AND CONCLUSIONS - HUMAN HEALTH EVALUATION

Health risks were calculated based on noncarcinogenic and or carcinogenic health effects of the chemicals. For chemicals exhibiting carcinogenic effects, the individual upper bound excess lifetime cancer risks were calculated. A risk level of $1x10^{-6}$, for example, represents an upper bound probability of one-in-one-million that an individual could contract cancer as a result of exposure to the potential carcinogen over a 70-year lifetime under the specified exposure conditions assessed in the BlRA. Potential risks associated with noncarcinogenic effects of chemicals were calculated by means of a hazard index (HI) technique as recommended by U.S. EPA.

The health risks calculated for the NPL Site (i.e., HIs and cancer risks) under current site conditions are summarized in Table 6-1. The health risk estimates are compared against two benchmarks. The upper bound lifetime excess cancer risks presented in this report can be compared to U.S. EPA's risk range for health protectiveness at Superfund sites of 10^{-6} to 10^{-4} (U.S. EPA 1990). This range is representative of risks which are acceptable for the selection of remedial alternatives. For noncarcinogenic effects, HIs which are less than one (1) are not likely to be associated with significant health risks.

The following is a summary of the findings of the baseline risk assessment under current conditions:

- For all current exposure conditions evaluated in this BlRA (soil, surface water, sediment, and groundwater exposures) and potentially exposed populations (residents, employees and construction workers) estimated excess lifetime cancer risks were below or within the $1x10^{-4}$ to $1x10^{-6}$ risk range, and non-cancer hazard indices were at or below 1.

The following is a summary of the findings of the baseline risk assessment under hypothetical future conditions:

- Under the hypothetical future use scenario performed for residents in the Blackhawk Acres Subdivision, the only exposure pathway that resulted in a cancer risk greater than $1x10^{-4}$ comes from assuming residents used untreated groundwater for domestic use.

- A second hypothetical future use scenario evaluated in the BlRA considered the potential that one or more of the nine private wells in the Village of Rockton would become affected by concentrations of chemicals similar to that detected in monitoring well W47C. Under this hypothetical scenario, an excess cancer risk of $1x10^{-4}$ and a noncancer hazard index > 1 were calculated assuming residents would use untreated groundwater for domestic purposes.

- A third hypothetical future use scenario considered residential development of the Beloit Corporation Property. Under this hypothetical scenario, an excess cancer risk > $1x10^{-4}$ and hazard index >1 were calculated assuming residents used untreated groundwater for domestic use.

- A final hypothetical future use scenario evaluated the potential for employees working exclusively (250 days/yr) in areas of contaminated surface soils. Under this scenario, cancer risks were estimated to be well below $1x10^{-4}$ and the noncancer hazard index was calculated to be slightly >1.

In conclusion, under current conditions excess lifetime cancer risks were below or within the $1x10^{-4}$ to $1x10^{-6}$ risk range, and non-cancer hazard indices were at or below 1 for all potential exposure pathways and populations evaluated in the BlRA. Only under hypothetical future scenarios is there the potential for an excess lifetime cancer risk >$1x10^{-4}$ or a hazard index >1 in the future.

9.3 SUMMARY AND CONCLUSIONS OF SCREENING LEVEL ECOLOGICAL ASSESSMENT (ERA)

Based on the results of the RI, a set of chemicals of potential concern were selected by media. Within the ERA, a habitat assessment was conducted to define groups of ecological receptors that have the potential to be exposed to the chemicals of potential concern. Two sets of ecological receptors were selected, which included:

- Sediment-Associated Biota
- Soil-Associated Biota (i.e., Soil invertebrates and plants)

To assess the level of exposure each of these receptors groups would potentially have, the RI data was used directly to compare to toxicity benchmark values. The following is a summary of the results of the Screening Level ERA and the Conclusions.

Potential risks associated with noncarcinogenic effects of chemicals were calculated by means of a hazard index technique similar to the HHE. The effects from simultaneous exposures to all chemicals of potential concern were computed by summing the individual ratios (HQs) within each exposure pathway. This sum, known as the hazard index (HI), serves the same function for the mixture as the HQ does for the individual compound. The evaluation of the significance of the HQ and HI values is conducted in a manner consistent with Menzie et al. (1992), as follows:

- HQ or HI less than 1: no adverse effects on ecological receptors is anticipated.
- HQ or HI between 1 and 10: there is limited potential for adverse effects on ecological receptors.
- HQ or HI between 10 and 100: there is potential for adverse effects on ecological receptors.
- HQ or HI exceeds 100: there is significant potential for adverse effects on ecological receptors.

A summary of the ecological risks associated with each receptor group is presented below.

9.3.1 Sediment Associated Biota

Within the Rock River, sediment analyte concentrations are generally lower than the toxicity benchmarks with a few exceptions. In general, sediment sample SD07 had concentrations of total PAHs, and a number of metals well above the toxicity benchmarks for sediment associated biota (i.e., HQ>100). However, this sample location is hydrologically up stream of the surface water runoff from much of the Beloit Corporation Facility. The source of the contamination at this location is not known.

With the exception of this single location (i.e., SD07), other sediment locations had levels of PAHs and metals, which were below the toxicity benchmarks or are just slightly in exceedance of the benchmark (i.e., HQ slightly>1). The primary analytes slightly in exceedance of the toxicity benchmarks were cadmium, and manganese. However, because the analyte concentrations are below or only slightly above the toxicity benchmark, there would be very limited potential for adverse effects on sediment associated biota.

Based on these results, further ecological risk assessment would not appear to be warranted for the sediment-associated biota. It should be noted too, that during the site walkover that the wetland habitats where some of the sediment samples had been collected (SD05 and SD06) appeared to be very healthy with a wide diversity of wetland plants growing.

9.3.2 Soil Associated Biota

Soil associated invertebrate toxicity benchmarks and plant toxicity benchmarks were compared to the analyte concentrations detected in the terrestrial habitats on the Beloit Corporation property.

A select number of metals exceeded their toxicity benchmarks for soil-associated invertebrates or plants. These included aluminum, antimony, chromium, copper, manganese, mercury, nickel, silver and vanadium, and zinc. However, in each case (other than aluminum, copper and chromium) the concentration of the analyte was generally within a factor of 2 to 3 of the background concentration of the metal and/or its toxicity benchmark values.

It should be noted that the terrestrial habitats on the Beloit Corporation property looked healthy, and no areas of stressed vegetation were observed. The plant communities appeared to have a wide diversity of plants and animals using them including higher trophic level carnivores, such as fox or coyotes based on observations of scat and burrows.

In addition, because of the nature and concentration of the analytes detected in the terrestrial habitats, bioaccumulation through the food chain would not be expected to pose a concern.

Based on this screening level assessment, further ecological risk assessment for the terrestrial habitats do not appear warranted.

9.3.3 Summary of Results and Conclusions - Screening Level ERA

Based on the results of the screening level ecological assessment, levels of analytes detected in wetland and terrestrial habitats would not be expected to pose a health concern to ecological receptors. For this reason, additional ecological risk assessment was not considered necessary for purposes of this BlRA.

10.0 REFERENCES

American Cancer Society (ACS), 1996. *Cancer Facts and Figures - 1996.* American Cancer Society, Inc.

Andelman, J. B., 1985. *Human Exposures to Volatile Halogenated Organic Chemicals in Indoor and Outdoor Air,* Environmental Health Perspective 62:313-318.

Barrio-Lage, G., F.Z. Parsons, R.S. Nassar, and P.A. Lorenzo, 1986. *Sequential Dehalogenation of Chlorinated Ethenes.* Environmental Science and Technology, 20:96-99.

Bower and McCartey, 1983. *Transformations of 1- and 2-Carbon Halogenated Aliphatic Organic Compounds Under Methanogenic Conditions,* Applied and Environmental Microbiology 45(40 1286-1294.

DeBruin, W.P., M.J.J. Kotterman, M.A. Posthumus, G. Schraa, and A.J.B. Zehnder, 1992. *Complete Biological Reductive Transformation of Tetrachloroethene to Ethane.* Appl. Environ. Microbiol., 58(6): 1996-2000.

Dragun J., 1988. *The Soil Chemistry of Hazardous Materials*, The Hazardous Materials Control Institute, Silver Spring, Maryland.

Gilbert, R.O., 1987. *Statistical Methods for Environmental Pollution Monitoring,* Van Nostrand.

HEAST (Health Effects Assessment Summary Tables), 1997. U.S. Environmental Protection Agency, Environmental Criteria and Assessment Office, Office of Health and Environmental Assessment, Cincinnati, Ohio.

Illinois Environmental Protection Agency (IEPA), 1994a. *Recommended Approach for the Assessment of Carcinogenic Risk from Exposure to PAHs in Soil.* Memorandum dated February 18, 1994 from James O'Brien, to Larry Eastep by Connie Sullinger.

Illinois Environmental Protection Agency (IEPA), 1994b. *Interim Default Values for the Estimation of the Dermal Adsorption of Chemicals from Soil.* Memorandum dated March 22, 1994 from Thomas Horshaw, to James O'Brien by Les Morrow.

Illinois Environmental Protection Agency (IEPA), 1997. *Tiered Approach to Corrective Action Objectives.* Illinois Register Part 742.

Illinois State Water Survey, H. Vernon Knapp, *Streamflow Conditions, Flooding, and Low Flows.*

IRIS (Integrated Risk Information System), 1996. U.S. Environmental Protection Agency, Office of Health and Environmental Assessment.

Mackay, D., W.Y. Shiu and K.C. Ma, 1992. *Illustrated Handbook of Physical-Chemical Properties and Environmental Fate for Organic Chemicals,* Volume III, Volatile Organic Chemicals, Lewis Publishers.

McKone, T.E., 1989. *Household Exposure Models.* Toxicology Letters 49, pp. 321-339.

McKone, T.E., 1991. *Dermal Uptake of Organic Chemicals from a Soil Matrix.* Risk Analysis 10, pp. 407-419.

Menzie, C. A. *et al.,* 1992. *Assessment of Methods for Estimating Ecological Risk in the Terrestrial Component: A Case Study at the Baird & McGuire Superfund Site in Holbrook, Massachusetts.* Env. Toxicol. & Chem., 11: 245-260.

Montgomery Watson, 1995. *Technical Memorandum 2, Beloit Corporation.*

Montgomery Watson, 1995b. *Engineering Evaluation, Cost Analysis.*

Montgomery Watson, 1996. *Removal Action Design Report.*

Montgomery Watson, 1996b. *Construction Observation Report.*

Montgomery Watson, 1997. *Technical Memorandum 3, Beloit Corporation*

Montgomery Watson, 1998. *Technical Memorandum 4, Beloit Corporation.*

Montgomery Watson, 1999. *Remedial Investigation Report, Beloit Corporation.*

Olson, R.L. and A. Davis, 1990. *Predicting the Fate and Transport of Organic Compounds in Groundwater Parts 1 and 2,* Hazardous Materials Control 3(3): 39-64 and 3(4): 18-37.

Parson, F., P.R. Wood, and J. Demarco, 1984. *Transformations of Tetrachloroethene and Trichloroethene in Microcosms and Groundwater.* Journal AWWA, February 1984, pp. 56-59.

U. S. Environmental Protection Agency (U.S. EPA), 1998. *Guidelines for Ecological Risk Assessment.* EPA 630/R-95/002F. April 1998.

U.S. Department of Energy, 1997. *Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates.*

U.S. Department of Energy, 1997b. *Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Terrestrial Plants.*

U.S. Department of Energy, 1997c. *Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Sediment-Associated Biota.*

U.S. Department of Energy, 1997d. *Preliminary Remediation Goals for Ecological Endpoints.*

U.S. Environmental Protection Agency (U.S. EPA) Region III, 1998. *Risk-Based Concentration Table.* April 1998.

U.S. Environmental Protection Agency (U.S. EPA), 1986a. *Guidelines for Carcinogenic Risk Assessment,* 51 FR 33992, September 24, 1986.

U.S. Environmental Protection Agency (U.S. EPA), 1989. *Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual (Part A),* EPA/540/1-89/002, (RAGS, Vol. I).

U.S. Environmental Protection Agency (U.S. EPA), 1990. *National Oil and Hazardous Substances Pollution Contingency plan.* Federal Register 55:8666-8865 (March 8, 1990).

U.S. Environmental Protection Agency (U.S. EPA), 1991a. *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals,* Publication 9285.7-01B, (RGS, Vol. I, Part B).

U.S. Environmental Protection Agency (U.S. EPA), 1991b. *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual, Supplemental Guidance, Standard Default Exposure Factors,* Office of Emergency and Remedial Response, Washington, D.C., OSWER Directive: 9285.6-03.

U.S. Environmental Protection Agency (U.S. EPA), 1991c. *Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part C, Risk Evaluation of Remedial Alternatives),* Publication 9285.7-01C, (RGS, Vol. I, Part C).

U.S. Environmental Protection Agency (U.S. EPA), 1992. *Dermal Exposure Assessment: Principles and Applications,* EPA/600/8-91/011B.

U.S. Environmental Protection Agency (U.S. EPA), 1992. *Supplemental Guidance to RAGS: Calculating the Concentration Term,* Publication 92857-081.

U.S. Environmental Protection Agency (U.S. EPA), 1993. *Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons,* EPA/600/R-93/089.

U.S. Environmental Protection Agency (U.S. EPA), 1994. *Revised Interim Soil and Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities.* OSWER Directive 9355.4-12.

U.S. Environmental Protection Agency (U.S. EPA), 1994. *Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for Lead in Children.* Publication 9285.7-15-1 or EPA/540R-93/081.

U.S. Environmental Protection Agency (U.S. EPA), 1997. *Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments,* Solid Waste and Emergency Responses, EPA 540-R-97-006, OSWER 9285.7-25.

U.S. Environmental Protection Agency (U.S. EPA), 1997. *Exposure Factors Handbook Volume I - General Factors,* Office of Research and Development, Washington, D.C., EPA/600/P-95/002Fa.

U.S. Environmental Protection Agency (U.S. EPA), 1997. *Exposure Factors Handbook Volume II - Food Ingestion Factors,* Office of Research and Development, Washington, D.C., EPA/600/P-95/002Fb.

U.S. Environmental Protection Agency (U.S. EPA), 1997. *Exposure Factors Handbook Volume III - Activity Factors,* Office of Research and Development, Washington, D.C., EPA/600/P-95/002Fc.

U.S. Fish and Wildlife Service (U.S. FWS), 1999. *National Wetlands Inventory – Digital Mapper.* http:\\www.nwi.fws.gov

U.S.G.S., 1984. *Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States,* U.S. Geological Survey Professional Paper 1270, U.S. Government Printing Office, Washington.

Wallace, L., 1986. *An Overview of the Total Exposure Assessment Methodology (TEAM) Study, Vol. 1, Final Report.* U.S. EPA, Washington, D.C. Cited in McKone, 1989.

Warzyn, 1984. *Hydrogeologic Investigation, Beloit Corporation.*

Warzyn, 1985. *Fibrous Landspreading Evaluation, Beloit Corporation.*

Warzyn, 1986. *Groundwater Information Review.*

Warzyn, 1987. *Beloit Corporation VOC Investigation.*

Warzyn, 1989. *Letter Report, July 26, 1989.*

Warzyn, 1990. *Site Evaluation Report.*

Warzyn, 1992. *Planning Documents, Beloit Corporation.*

Warzyn, 1993. *Technical Memorandum 1, Beloit Corporation.*

Warzyn, 1994. *Planning Documents Phase 2 Remedial Investigation, Addendum No. 1.*

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Table 3-1
Chemicals of Potential Concern By Medium and Area
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

	Investigation Media/Area											
	On-Site	On-Site	On-Site	Off-Site	Off-Site	Sediment	Monitoring	Private Wells				
	All depths	surface	0-10 ft	All depths	surface	Maximum	Wells (9)	All Wells	PW[1]	PW[2]	PW[3]	PW[4]
VOLATILES												
Chloromethane							X	X				X
Methylene chloride								X				X
Acetone	X	X	X			X						
Carbon disulfide				X			X					
1,1-Dichloroethene							X	X	X			
1,1-Dichloroethane	X						X	X		X		X
1,2-Dichloroethene (cis)							X					
Chloroform				X				X			X	
1,2-Dichloroethane							X					
2-Butanone	X			X		X						
1,1,1-Trichloroethane	X						X	X	X	X		X
Carbon tetrachloride							X					
Trichloroethene							X	X		X		X
Benzene				X								
4-Methyl-2-pentanone				X								
2-Hexanone	X			X								
Tetrachloroethene	X	X	X				X	X	X			X
Toluene	X	X	X	X								
Ethylbenzene	X		X			X						
Xylenes (mixed)	X		X			X						
Dichlorodifluoromethane								X				X
SEMIVOLATILES												
Phenol	X						X					
1,4-Dichlorobenzene								X				X
2-Methylphenol	X											
4-Methylphenol	X					X						
2,4-Dimethylphenol	X											
Naphthalene	X		X			X						
2-Methylnaphthalene	X					X						
Dimethylphthalate							X					
Acenaphthylene						X						
Acenaphthene n	X	X	X			X						
4-Nitrophenol	X	X	X									
Dibenzofuran	X	X	X			X						
Diethylphthalate							X					
Fluorene n	X	X	X			X						
Phenanthrene n	X	X	X	X	X	X						
Anthracene n	X	X	X	X	X	X						
Di-n-butylphthalate				X	X	X	X					
Fluoranthene n	X	X	X	X	X	X						
Pyrene n	X	X	X	X	X	X						
Butylbenzylphthalate				X	X							
Benzo(a)anthracene c	X	X	X	X	X	X						
Chrysene c	X	X	X	X	X	X						
bis(2-ethylhexyl)phthalate	X	X	X	X	X							
Di-n-octyl Phthalate	X	X	X									
Benzo(b)fluoranthene c	X	X	X	X	X	X						
Benzo(k)fluoranthene c	X	X	X	X	X	X						
Benzo(a)pyrene c	X	X	X	X	X	X						
Indeno(1,2,3-cd)pyrene c	X	X	X	X	X	X						
Dibenz(a,h)anthracene c	X	X	X	X	X	X						
Benzo(g,h,i)perylene n	X	X	X	X	X	X						
Carbazole	X	X	X									

Table 3-1
Chemicals of Potential Concern By Medium and Area
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

	Investigation Media/Area											
	On-Site All depths	On-Site surface	On-Site 0-10 ft	Off-Site All depths	Off-Site surface	Sediment Maximum	Monitoring Wells (9)	Private Wells				
								All Wells	PW[1]	PW[2]	PW[3]	PW[4]
PESTICIDES/PCBs												
Heptachlor	X						X					
Aldrin	X	X	X									
4,4'-DDE												
Endrin												
4,4'-DDT	X	X	X									
Methoxychlor	X											
Endrin ketone	X											
PCB	X	X	X									
Endrin Aldehyde							X					
METALS												
Aluminum	X	X	X	X	X	X	X					
Antimony	X	X	X	X	X							
Arsenic	X	X	X	X	X	X	X					
Barium	X	X	X	X	X	X	X					
Beryllium	X	X	X									
Cadmium (water)							X					
Cadmium (food/soil)	X	X	X	X	X	X						
Chromium III	X		X									
Chromium VI	X	X		X	X	X	X					
Cobalt	X	X	X	X	X	X	X					
Copper	X	X	X	X	X	X	X					
Lead	X	X	X	X	X	X	X					
Manganese	X	X	X	X	X	X	X					
Mercury	X	X	X	X	X	X	X					
Nickel	X	X	X	X	X	X	X					
Selenium	X	X	X			X	X					
Silver	X	X	X	X	X							
Thallium						X						
Vanadium	X	X	X	X	X	X						
Zinc	X	X	X	X	X	X	X					
Cyanide	X	X	X				X					

Footnotes:
1. PW1 = private wells with no point of use treatment system (Hypothetical) for specific Southern Blackhawk Subdivision Residents that have had point of use treatment systems installed by the IEPA. (See table D-2)
2. PW2 = private wells with no point of use treatment system (Hypothetical) for specific Eastern Blackhawk Subdivision Residents that have had point of use treatment systems installed by the IEPA. (See Table D-3)
3. PW3 = private wells with no point of use treatment system for specific Northern Blackhawk Subdivision Residents that do not have point-of-use groundwater treatment systems, and have chloroform affected groundwater. (See Table D-4)
4. PW4. Other private wells with no point of use treatment systems for specific Blackhawk Subdivision Residents that do not have point-of-use groundwater treatment systems. 112 Blackhawk is currently the only other well showing detects of organic analytes based on the most current sampling results. (See Table D-5)
5. All depths - Compound in all the soil samples above the water table.
6. 0 to 10 ft - Compound in soil samples from the 0 to 10 ft interval only.
7. Surface - Compound in surface samples only (0-1 ft).
8. Essential nutrients are not included as COPCs (Ca, Mg, Na, Fe, K)
9. VOCs considered COPCs in monitoring wells were considered potentially COPCs in Rock River surface water south of the Village of Rockton where the plume discharges to the River.

Table 3-2
Occurance and Distribution of Chemicals of Potential Concern In Surface Soil
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Matrix: Soils 0-1 ft Depth

Type	Parameter	Unit	Risk Based Concentration		Min. Conc	Max. Conc	Max. Conc. Location	No. Detects	No. Samples	Non-Detects Only			
			Industrial	Residential						Min SQL		Max SQL	
VOC	Chloromethane	mg/kg	440	49					24	0.01		0.014	
VOC	Bromomethane	mg/kg	2900	110					24	0.01		0.014	
VOC	Vinyl chloride	mg/kg	3	0.34					24	0.01		0.014	
VOC	Chloroethane	mg/kg	2000	220					24	0.01		0.014	
VOC	Methylene chloride	mg/kg	760	85					24	0.01		0.11	
VOC	Acetone	mg/kg	204400	7800	0.067	0.089	BC-SUSG130-00	2	24	0.01		0.014	
VOC	Carbon disulfide	mg/kg	204400	7800					24	0.01		0.014	
VOC	1,1-Dichloroethene	mg/kg	9.5	1.1					24	0.01		0.014	
VOC	1,1-Dichloroethane	mg/kg	200000	7800					24	0.01		0.014	
VOC	1,2-Dichloroethene (total)	mg/kg	18000	700					24	0.01		0.014	
VOC	Chloroform	mg/kg	940	100					24	0.01		0.014	
VOC	1,2-Dichloroethane	mg/kg	63	7					24	0.01		0.014	
VOC	2-Butanone	mg/kg	1200000	47000					24	0.01		0.014	
VOC	1,1,1-Trichloroethane	mg/kg	41000	1600					24	0.01		0.014	
VOC	Carbon tetrachloride	mg/kg	44	4.9					24	0.01		0.014	
VOC	Bromodichloromethane	mg/kg	92	10					24	0.01		0.014	
VOC	1,2-Dichloropropane	mg/kg	84	9.4					24	0.01		0.014	
VOC	cis-1,3-Dichloropropene	mg/kg	32	3.5					24	0.01		0.014	
VOC	Trichloroethene	mg/kg	520	58					24	0.01		0.014	
VOC	Dibromochloromethane	mg/kg	68	7.6					24	0.01		0.014	
VOC	1,1,2-Trichloroethane	mg/kg	100	11					24	0.01		0.014	
VOC	Benzene	mg/kg	200	22					24	0.01		0.014	
VOC	trans-1,3-Dichloropropene	mg/kg	32	3.5					24	0.01		0.014	
VOC	Bromoform	mg/kg	720	81					24	0.01		0.014	
VOC	4-Methyl-2-pentanone	mg/kg	160000	6300					24	0.01		0.014	
VOC	2-Hexanone	mg/kg	82000	3100					24	0.01		0.014	
VOC	Tetrachloroethene	mg/kg	110	12	0.004	0.008	BC-SUSG130-00	2	24	0.01		0.014	
VOC	1,1,2,2-Tetrachloroethane	mg/kg	29	3.2					24	0.01		0.014	
VOC	Toluene	mg/kg	410000	16000	0.002	0.006	BC-SSSSS03-01	2	24	0.01		0.014	
VOC	Chlorobenzene	mg/kg	41000	1600					24	0.01		0.014	
VOC	Ethylbenzene	mg/kg	200000	7800					24	0.01		0.014	
VOC	Styrene	mg/kg	410000	16000					24	0.01		0.014	
VOC	Xylenes (total)	mg/kg	4100000	160000					24	0.01		0.014	
SVOC	Phenol	mg/kg	1200000	47000					24	0.35		2.2	
SVOC	bis(2-Chloroethyl) ether	mg/kg	5.2	0.58					24	0.35		2.2	R
SVOC	2-Chlorophenol	mg/kg	10000	390					24	0.35		2.2	
SVOC	1,3-Dichlorobenzene	mg/kg	61000	2300					24	0.35		2.2	
SVOC	1,4-Dichlorobenzene	mg/kg	240	27					24	0.35		2.2	
SVOC	1,2-Dichlorobenzene	mg/kg	180000	7000					24	0.35		2.2	
SVOC	2-Methylphenol	mg/kg	100000	3900					24	0.35		2.2	
SVOC	bis(2-Chloroisopropyl)ether	mg/kg	82	9.1					24	0.35		2.2	
SVOC	4-Methylphenol	mg/kg	10000	390					24	0.35		2.2	
SVOC	N-Nitroso-di-n-propylamine	mg/kg	0.82	0.091					24	0.35	R	2.2	I

Table 3-2
Occurance and Distribution of Chemicals of Potential Concern In Surface Soil
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Matrix: Soils 0-1 ft Depth

			Risk Based Concentration							Non-Detects Only	
Type	Parameter	Unit	Industrial	Residential	Min. Conc	Max. Conc	Max. Conc. Location	No. Detects	No. Samples	Min SQL	Max SQL	
SVOC	Hexachloroethane	mg/kg	410	46					24	0.35	2.2	
SVOC	Nitrobenzene	mg/kg	1000	39					24	0.35	2.2	
SVOC	Isophorone	mg/kg	6000	670					24	0.35	2.2	
SVOC	2-Nitrophenol	mg/kg							24	0.35	2.2	
SVOC	2,4-Dimethylphenol	mg/kg	41000	1600					24	0.35	2.2	
SVOC	bis(2-Chloroethoxy)methane	mg/kg							24	0.35	2.2	
SVOC	2,4-Dichlorophenol	mg/kg	6100	230					24	0.35	2.2	
SVOC	1,2,4-Trichlorobenzene	mg/kg	20000	780					24	0.35	2.2	
SVOC	Naphthalene	mg/kg	82000	3100					24	0.35	2.2	
SVOC	4-Chloroaniline	mg/kg	8200	310					24	0.35	2.2	
SVOC	Hexachlorobutadiene	mg/kg	73	8.2					24	0.35	2.2	
SVOC	4-Chloro-3-methylphenol	mg/kg							24	0.35	2.2	
SVOC	2-Methylnaphthalene	mg/kg	82000	3100					24	0.35	2.2	
SVOC	Hexachlorocyclopentadiene	mg/kg	14000	550					24	0.35	2.2	
SVOC	2,4,6-Trichlorophenol	mg/kg	520	58					24	0.35	2.2	
SVOC	2,4,5-Trichlorophenol	mg/kg	200000	7800					24	0.83	5.4	
SVOC	2-Chloronaphthalene	mg/kg	160000	6300					24	0.35	2.2	
SVOC	2-Nitroaniline	mg/kg							24	0.83	5.4	
SVOC	Dimethylphthalate	mg/kg	20000000	780000					24	0.35	2.2	
SVOC	Acenaphthylene	mg/kg	82000	3100					24	0.35	2.2	
SVOC	2,6-Dinitrotoluene	mg/kg	2000	78					24	0.35	2.2	
SVOC	3-Nitroaniline	mg/kg							24	0.83	5.4	
SVOC	Acenaphthene	mg/kg	120000	4700	0.099	0.23	BC-SUSB21-00	3	24	0.35	2.2	
SVOC	2,4-Dinitrophenol	mg/kg	4100	160					24	0.83	5.4	
SVOC	4-Nitrophenol	mg/kg	16000	630	0.099	0.1	BC-SUSB21-00	2	24	0.83	5.4	
SVOC	Dibenzofuran	mg/kg	8200	310	0.06	0.095	BC-SSSSS06-01	2	24	0.35	2.2	
SVOC	2,4-Dinitrotoluene	mg/kg	4100	160					24	0.35	2.2	
SVOC	Diethylphthalate	mg/kg	1600000	63000					24	0.35	2.2	
SVOC	4-Chlorophenyl-phenylether	mg/kg							24	0.35	2.2	
SVOC	Fluorene	mg/kg	82000	3100	0.059	0.19	BC-SUSB21-00	3	24	0.35	2.2	
SVOC	4-Nitroaniline	mg/kg							24	0.83	5.4	
SVOC	4,6-Dinitro-2-methylphenol	mg/kg	200	7.8					24	0.83	5.4	
SVOC	N-nitrosodiphenylamine	mg/kg	1200	130					24	0.35	2.2	
SVOC	4-Bromophenyl-phenylether	mg/kg							24	0.35	2.2	
SVOC	Hexachlorobenzene	mg/kg	3.6	0.4					24	0.35	2.2	R
SVOC	Pentachlorophenol	mg/kg	48	5.3					24	0.83	5.4	R
SVOC	Phenanthrene	mg/kg	61000	2300	0.058	1.6	BC-SUSB21-00	7	24	0.35	0.43	
SVOC	Anthracene	mg/kg	610000	23000	0.069	0.46	BC-SUSB21-00	4	24	0.35	2.2	
SVOC	Di-n-butylphthalate	mg/kg	200000	7800					24	0.35	2.2	
SVOC	Fluoranthene	mg/kg	82000	3100	0.045	2.5	BC-SUSB21-00	10	24	0.35	0.43	
SVOC	Pyrene	mg/kg	61000	2300	0.04	1.8	BC-SUSB21-00	10	24	0.35	0.43	
SVOC	Butylbenzylphthalate	mg/kg	410000	16000					24	0.35	2.2	
SVOC	3,3'-Dichlorobenzidine	mg/kg	13	1.4					24	0.35	2.2	R
SVOC	Benzo(a)anthracene	mg/kg	7.8	0.87	0.038	1	R BC-SUSB21-00	8	24	0.35	0.43	

Table 3-2
Occurance and Distribution of Chemicals of Potential Concern In Surface Soil
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Matrix: Soils 0-1 ft Depth

			Risk Based Concentration								Non-Detects Only		
Type	Parameter	Unit	Industrial	Residential	Min. Conc		Max. Conc		Max. Conc. Location	No. Detects	No. Samples	Min SQL	Max SQL
SVOC	Chrysene	mg/kg	780	87	0.041		1.4		BC-SUSB21-00	10	24	0.35	0.43
SVOC	bis(2-ethylhexyl)phthalate	mg/kg	410	46	0.043		0.21		BC-SUSG130-00	7	24	0.35	2.2
SVOC	Di-n-octyl Phthalate	mg/kg	41000	1600	0.074		0.15		BC-SUSG130-00	3	24	0.35	2.2
SVOC	Benzo(b)fluoranthene	mg/kg	7.8	0.87	0.047		1.7	R	BC-SUSB21-00	7	24	0.35	0.43
SVOC	Benzo(k)fluoranthene	mg/kg	78	8.7	0.052		1.7		BC-SUSB21-00	8	24	0.35	0.43
SVOC	Benzo(a)pyrene	mg/kg	0.78	0.087	0.046		1	I	BC-SUSB21-00	8	24	0.35 R	0.43 R
SVOC	Indeno(1,2,3-cd)pyrene	mg/kg	7.8	0.87	0.15		0.7		BC-SUSB21-00	7	24	0.35	0.43
SVOC	Dibenz(a,h)anthracene	mg/kg	0.78	0.087	0.11	R	0.11	R	BC-SUSB21-00	1	24	0.35 R	2.2 I
SVOC	Benzo(g,h,i)perylene	mg/kg	61000	2300	0.17		0.77		BC-SUSB21-00	6	24	0.35	2.2
SVOC	Carbazole	mg/kg	290	32	0.14		0.19		BC-SUSB21-00	3	24	0.35	2.2
PPCB	alpha-BHC	mg/kg	0.91	0.1							24	0.0018	0.0023
PPCB	beta-BHC	mg/kg	3.2	0.35							24	0.0018	0.0023
PPCB	delta-BHC	mg/kg									24	0.0018	0.0023
PPCB	gamma-BHC (Lindane)	mg/kg	4.4	0.49							24	0.0018	0.0023
PPCB	Heptachlor	mg/kg	1.3	0.14							24	0.0018	0.0023
PPCB	Aldrin	mg/kg	0.34	0.038	0.0018		0.0018		BC-SSSB27-00	1	24	0.0018	0.0023
PPCB	Heptachlor epoxide	mg/kg	0.63	0.07							24	0.0018	0.0023
PPCB	Endosulfan I	mg/kg	12000	470							24	0.0018	0.0023
PPCB	Dieldrin	mg/kg	0.36	0.04							24	0.0034	0.0045
PPCB	4,4'-DDE	mg/kg	17	1.9							24	0.0034	0.0045
PPCB	Endrin	mg/kg	610	23							24	0.0034	0.0045
PPCB	Endosulfan II	mg/kg	12000	470							24	0.0034	0.0045
PPCB	4,4'-DDD	mg/kg	24	2.7							24	0.0034	0.0045
PPCB	Endosulfan sulfate	mg/kg	12000	470							24	0.0034	0.0045
PPCB	4,4'-DDT	mg/kg	17	1.9	0.0023		0.0032		BC-SSSSS07-01D	2	24	0.0034	0.0045
PPCB	Methoxychlor	mg/kg	10000	390							24	0.018	0.023
PPCB	Endrin ketone	mg/kg	610	23							24	0.0034	0.0045
PPCB	alpha-Chlordane	mg/kg	16	1.8							24	0.0018	0.0023
PPCB	gamma-Chlordane	mg/kg	16	1.8							24	0.0018	0.0023
PPCB	Toxaphene	mg/kg	5.2	0.58							24	0.18	0.23
PPCB	Aroclor-1016	mg/kg	82	5.5							24	0.034	0.045
PPCB	Aroclor-1221	mg/kg	2.9	0.32							24	0.07	0.091
PPCB	Aroclor-1232	mg/kg	2.9	0.32							24	0.034	0.045
PPCB	Aroclor-1242	mg/kg	2.9	0.32							24	0.034	0.045
PPCB	Aroclor-1248	mg/kg	2.9	0.32	0.024		0.024		BC-SUSB19-00	1	24	0.034	0.045
PPCB	Aroclor-1254	mg/kg	2.9	0.32	0.039		0.36	R	BC-SUSB21-00	6	24	0.036	0.045
PPCB	Aroclor-1260	mg/kg	2.9	0.32	0.011		0.042		BC-SUSB16-00	3	24	0.034	0.043
PPCB	Endrin aldehyde	mg/kg	610	23							24	0.0034	0.0045
MTL	Aluminum	MG/KG	2044000	78000	496		12900		BC-SUSG130-00	24	24		
MTL	Antimony	MG/KG	820	31	7.8		8.7		BC-SSSSS05-01	2	11	10.3	11.9
MTL	Arsenic	MG/KG	3.8	0.43	0.45	R	5.1	I	BC-SUSG130-00	24	24		
MTL	Barium	MG/KG	140000	5500	6		128		BC-SUSG130-00	24	24		
MTL	Beryllium	MG/KG	4100	160	0.21		0.62		BC-SSSSS11-01	15	24	1	1.2
MTL	Cadmium	MG/KG	1000	39	0.56		4.3		BC-SUSG130-00	10	24	0.48	0.56

Table 3-2
Occurance and Distribution of Chemicals of Potential Concern In Surface Soil
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Matrix: Soils 0-1 ft Depth

			Risk Based Concentration							Non-Detects Only	
Type	Parameter	Unit	Industrial	Residential	Min. Conc	Max. Conc	Max. Conc. Location	No. Detects	No. Samples	Min SQL	Max SQL
MTL	Calcium	MG/KG			1240	203000	BC-SUSG130-00	24	24		
MTL	Chromium, total	MG/KG	2000000	78000	1.9	73.4	BC-SUSG130-00	24	24		
MTL	Cobalt	MG/KG	120000	4700	1.6	8.1	BC-SUSG130-00	23	24	1.4	1.4
MTL	Copper	MG/KG	82000	3100	5.5	1550	BC-SUSG130-00	23	24	5.1	5.1
MTL	Iron	MG/KG	610000	23000	3320	16900	BC-SUSG130-00	24	24		
MTL	Lead	MG/KG			5.1	827	BC-SUSG130-00	24	24		
MTL	Magnesium	MG/KG			1170	131000	BC-SUSG130-00	24	24		
MTL	Manganese	MG/KG	41000	1600	198	681	BC-SUSG130-00	24	24		
MTL	Mercury	MG/KG			0.16	0.39	BC-SUSB19-00	5	24	0.04	0.12
MTL	Nickel	MG/KG	41000	1600	6.4	65.9	BC-SUSG130-00	14	24	5.2	10.3
MTL	Potassium	MG/KG			202	1050	BC-SUSG130-00	24	24		
MTL	Selenium	MG/KG	10000	390	0.26	0.71	BC-SUSG130-00	7	24	0.21	0.48
MTL	Silver	MG/KG	10000	390	2.9	2.9	BC-SUSB11-00	1	24	0.58	2.4
MTL	Sodium	MG/KG			488	488	BC-SUSB16-00	1	24	394	477
MTL	Thallium	MG/KG	140	5.5					24	0.21	0.72
MTL	Vanadium	MG/KG	14000	550	3.8	36.5	BC-SUSG130-00	22	24	10.3	10.5
MTL	Zinc	MG/KG	610000	23000	19.7	130	BC-SUSG130-00	24	24		
MTL	Cyanide	MG/KG	41000	1600	0.62	0.94	BC-SSSSS09-01	5	24	0.52	1.5

Notes:
This table includes analytical results for all soil samples designated as either surface soils or soil borings and collected from 0-1 ft depths throughout the entire Beloit Corporation - Blackhawk Facility NPL Site . Note that organic analytical results have been converted from ug/kg to mg/kg for risk assessment purposes. Blank cells denote that the compound was detected below SQLs. Quantitation limits for each compound can be found in Appendix G of the RI report (Montgomery Watson 1999).

1. The EPA Region III Risk Based Concentrations (RBCs) from April 1, 1998 Table are included for both commercial/industrial soil ingestion and residential soil ingestion scenarios. RBCs were not available for the detected parameters Phenanthrene and Benzo(g,h,i)perylene, therefore pyrene RBCs were used as a surrogate value.
2. Min. and Max. concentrations, max. concentration location, and SQLs for non-detects only are provided for each compound analyzed. Blanks in the min and max conc. locations indicate the compound was not detected.
3. Concentrations and SQLs equal to or greater than either the industrial or residential RBC are flagged "I".
4. Concentrations and SQLs equal to or greater than the residential RBC are flagged "R".

Table 3-3
Occurance and Distribution of Chemicals of Potential Concern In Subsurface Soils
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Matrix: Soils >1 ft Depth

Type	Parameter	Unit	Risk Based Concentration		Min. Conc	Max. Conc	Max. Conc. Location	No. Detects	No. Samples	Non-Detects Only	
			Industrial	Residential						Min SQL	Max SQL
VOC	Chloromethane	mg/kg	440	49					46	0.01	0.054
VOC	Bromomethane	mg/kg	2900	110					46	0.01	0.054
VOC	Vinyl chloride	mg/kg	3	0.34					46	0.01	0.054
VOC	Chloroethane	mg/kg	2000	220					46	0.01	0.054
VOC	Methylene chloride	mg/kg	760	85					46	0.01	0.068
VOC	Acetone	mg/kg	204400	7800					46	0.01	0.23
VOC	Carbon disulfide	mg/kg	204400	7800					46	0.01	0.054
VOC	1,1-Dichloroethene	mg/kg	9.5	1.1					46	0.01	0.054
VOC	1,1-Dichloroethane	mg/kg	200000	7800	0.003	0.015	BC-SSSB12-12	2	46	0.01	0.054
VOC	1,2-Dichloroethene (total)	mg/kg	18000	700	0.004	0.004	BC-SSSB33-24	1	46	0.01	0.054
VOC	Chloroform	mg/kg	940	100					46	0.01	0.054
VOC	1,2-Dichloroethane	mg/kg	63	7					46	0.01	0.054
VOC	2-Butanone	mg/kg	1200000	47000	0.008	0.008	BC-SSSB28-25	1	46	0.01	0.054
VOC	1,1,1-Trichloroethane	mg/kg	41000	1600	0.002	0.003	BC-SSSB12-12	2	46	0.01	0.054
VOC	Carbon tetrachloride	mg/kg	44	4.9					46	0.01	0.054
VOC	Bromodichloromethane	mg/kg	92	10					46	0.01	0.054
VOC	1,2-Dichloropropane	mg/kg	84	9.4					46	0.01	0.054
VOC	cis-1,3-Dichloropropene	mg/kg	32	3.5					46	0.01	0.054
VOC	Trichloroethene	mg/kg	520	58					46	0.01	0.054
VOC	Dibromochloromethane	mg/kg	68	7.6					46	0.01	0.054
VOC	1,1,2-Trichloroethane	mg/kg	100	11					46	0.01	0.054
VOC	Benzene	mg/kg	200	22					46	0.01	0.054
VOC	trans-1,3-Dichloropropene	mg/kg	32	3.5					46	0.01	0.054
VOC	Bromoform	mg/kg	720	81					46	0.01	0.054
VOC	4-Methyl-2-pentanone	mg/kg	160000	6300					46	0.01	0.054
VOC	2-Hexanone	mg/kg	82000	3100	0.004	0.004	BC-SSSB28-25	1	46	0.01	0.054
VOC	Tetrachloroethene	mg/kg	110	12	0.001	0.433	BC-SSSB35-30	15	46	0.01	0.013
VOC	1,1,2,2-Tetrachloroethane	mg/kg	29	3.2					46	0.01	0.054
VOC	Toluene	mg/kg	410000	16000	0.001	0.001	BC-SSSB29-28	1	46	0.01	0.054
VOC	Chlorobenzene	mg/kg	41000	1600					46	0.01	0.054
VOC	Ethylbenzene	mg/kg	200000	7800	0.008	0.008	BC-SSSB20-03	1	46	0.01	0.054
VOC	Styrene	mg/kg	410000	16000					46	0.01	0.054
VOC	Xylenes (total)	mg/kg	4100000	160000	0.25	0.25	BC-SSSB20-03	1	46	0.01	0.054
SVOC	Phenol	mg/kg	1200000	47000	0.19	0.19	BC-SSSB12-12	1	34	0.33	3.8
SVOC	bis(2-Chloroethyl) ether	mg/kg	5.2	0.58					34	0.33	3.8 R
SVOC	2-Chlorophenol	mg/kg	10000	390					34	0.33	3.8
SVOC	1,3-Dichlorobenzene	mg/kg	61000	2300					34	0.33	3.8
SVOC	1,4-Dichlorobenzene	mg/kg	240	27					34	0.33	3.8
SVOC	1,2-Dichlorobenzene	mg/kg	180000	7000					34	0.33	3.8
SVOC	2-Methylphenol	mg/kg	100000	3900	0.17	0.17	BC-SSSB12-12	1	34	0.33	3.8

Table 3-3
Occurance and Distribution of Chemicals of Potential Concern In Subsurface Soils
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Matrix: Soils >1 ft Depth

Type	Parameter	Unit	Risk Based Concentration Industrial	Risk Based Concentration Residential	Min. Conc	Max. Conc	Max. Conc. Location	No. Detects	No. Samples	Non-Detects Only Min SQL		Non-Detects Only Max SQL	
SVOC	bis(2-Chloroisopropyl)ether	mg/kg	82	9.1					34	0.33		3.8	
SVOC	4-Methylphenol	mg/kg	10000	390	0.25	0.58	BC-SSSB12-14	2	34	0.33		0.44	
SVOC	N-Nitroso-di-n-propylamine	mg/kg	0.82	0.091					34	0.33	R	3.8	I
SVOC	Hexachloroethane	mg/kg	410	46					34	0.33		3.8	
SVOC	Nitrobenzene	mg/kg	1000	39					34	0.33		3.8	
SVOC	Isophorone	mg/kg	6000	670					34	0.33		3.8	
SVOC	2-Nitrophenol	mg/kg							34	0.33		3.8	
SVOC	2,4-Dimethylphenol	mg/kg	41000	1600	0.17	0.39	BC-SSSB12-14	2	34	0.33		0.44	
SVOC	bis(2-Chloroethoxy)methane	mg/kg							34	0.33		3.8	
SVOC	2,4-Dichlorophenol	mg/kg	6100	230					34	0.33		3.8	
SVOC	1,2,4-Trichlorobenzene	mg/kg	20000	780					34	0.33		3.8	
SVOC	Naphthalene	mg/kg	82000	3100	0.062	3.1	BC-SSSB12-14	4	34	0.33		0.44	
SVOC	4-Chloroaniline	mg/kg	8200	310					34	0.33		3.8	
SVOC	Hexachlorobutadiene	mg/kg	73	8.2					34	0.33		3.8	
SVOC	4-Chloro-3-methylphenol	mg/kg							34	0.33		3.8	
SVOC	2-Methylnaphthalene	mg/kg	82000	3100	0.038	2.1	BC-SSSB12-14	3	34	0.33		0.44	
SVOC	Hexachlorocyclopentadiene	mg/kg	14000	550					34	0.33		3.8	
SVOC	2,4,6-Trichlorophenol	mg/kg	520	58					34	0.33		3.8	
SVOC	2,4,5-Trichlorophenol	mg/kg	200000	7800					34	0.81		9.2	
SVOC	2-Chloronaphthalene	mg/kg	160000	6300					34	0.33		3.8	
SVOC	2-Nitroaniline	mg/kg							34	0.81		9.2	
SVOC	Dimethylphthalate	mg/kg	20000000	780000					34	0.33		3.8	
SVOC	Acenaphthylene	mg/kg	82000	3100					34	0.33		3.8	
SVOC	2,6-Dinitrotoluene	mg/kg	2000	78					34	0.33		3.8	
SVOC	3-Nitroaniline	mg/kg							34	0.81		9.2	
SVOC	Acenaphthene	mg/kg	120000	4700	0.15	3.5	BC-SSSB12-14	5	35	0.33		0.44	
SVOC	2,4-Dinitrophenol	mg/kg	4100	160					34	0.81		9.2	
SVOC	4-Nitrophenol	mg/kg	16000	630					34	0.81		9.2	
SVOC	Dibenzofuran	mg/kg	8200	310	0.066	1.4	BC-SSSB12-14	5	35	0.33		0.44	
SVOC	2,4-Dinitrotoluene	mg/kg	4100	160					34	0.33		3.8	
SVOC	Diethylphthalate	mg/kg	1600000	63000					34	0.33		3.8	
SVOC	4-Chlorophenyl-phenylether	mg/kg							34	0.33		3.8	
SVOC	Fluorene	mg/kg	82000	3100	0.13	2.5	BC-SSSB12-14	5	35	0.33		0.44	
SVOC	4-Nitroaniline	mg/kg							34	0.81		9.2	
SVOC	4,6-Dinitro-2-methylphenol	mg/kg	200	7.8					34	0.81		9.2	R
SVOC	N-nitrosodiphenylamine	mg/kg	1200	130					34	0.33		3.8	
SVOC	4-Bromophenyl-phenylether	mg/kg							34	0.33		3.8	
SVOC	Hexachlorobenzene	mg/kg	3.6	0.4					34	0.33		3.8	I
SVOC	Pentachlorophenol	mg/kg	48	5.3					34	0.81		9.2	R
SVOC	Phenanthrene	mg/kg	61000	2300	0.057	27	BC-SSSB12-14	8	35	0.33		0.44	
SVOC	Anthracene	mg/kg	610000	23000	0.25	4.8	BC-SSSB12-14	5	35	0.33		0.44	
SVOC	Di-n-butylphthalate	mg/kg	200000	7800					34	0.33		3.8	

Table 3-3
Occurance and Distribution of Chemicals of Potential Concern In Subsurface Soils
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Matrix: Soils >1 ft Depth

Type	Parameter	Unit	Risk Based Concentration: Industrial	Risk Based Concentration: Residential	Min. Conc		Max. Conc		Max. Conc. Location	No. Detects	No. Samples	Non-Detects Only: Min SQL		Non-Detects Only: Max SQL	
SVOC	Fluoranthene	mg/kg	82000	3100	0.038		57		BC-SSSB12-14	11	35	0.33		0.44	
SVOC	Pyrene	mg/kg	61000	2300	0.039		51		BC-SSSB12-14	9	35	0.33		0.44	
SVOC	Butylbenzylphthalate	mg/kg	410000	16000							34	0.33		3.8	
SVOC	3,3'-Dichlorobenzidine	mg/kg	13	1.4							34	0.33		3.8	R
SVOC	Benzo(a)anthracene	mg/kg	7.8	0.87	0.036		56	I	BC-SSSB12-14	7	35	0.33		0.44	
SVOC	Chrysene	mg/kg	780	87	0.037		54		BC-SSSB12-14	7	35	0.33		0.44	
SVOC	bis(2-ethylhexyl)phthalate	mg/kg	410	46	0.064		2.1		BC-SSSB12-14	6	34	0.33		0.91	
SVOC	Di-n-octyl Phthalate	mg/kg	41000	1600							34	0.33		3.8	
SVOC	Benzo(b)fluoranthene	mg/kg	7.8	0.87	0.042		130	I	BC-SSSB12-14	8	35	0.33		0.44	
SVOC	Benzo(k)fluoranthene	mg/kg	78	8.7	0.045		130	I	BC-SSSB12-14	7	35	0.33		0.44	
SVOC	Benzo(a)pyrene	mg/kg	0.78	0.087	0.046		57	I	BC-SSSB12-14	6	35	0.33	R	0.44	R
SVOC	Indeno(1,2,3-cd)pyrene	mg/kg	7.8	0.87	0.48		57	I	BC-SSSB12-14	4	35	0.33		0.44	
SVOC	Dibenz(a,h)anthracene	mg/kg	0.78	0.087	0.14	R	9.2	I	BC-SSSB12-14	3	34	0.33	R	0.44	R
SVOC	Benzo(g,h,i)perylene	mg/kg	61000	2300	0.26		73		BC-SSSB12-14	4	35	0.33		0.44	
SVOC	Carbazole	mg/kg	290	32	0.11		2.5		BC-SSSB12-14	5	35	0.33		0.44	
PPCB	alpha-BHC	mg/kg	0.91	0.1							45	0.0017		0.02	
PPCB	beta-BHC	mg/kg	3.2	0.35							45	0.0017		0.02	
PPCB	delta-BHC	mg/kg									45	0.0017		0.02	
PPCB	gamma-BHC (Lindane)	mg/kg	4.4	0.49							45	0.0017		0.02	
PPCB	Heptachlor	mg/kg	1.3	0.14	0.00065		0.001		BC-SSSB09-16	4	45	0.0017		0.02	
PPCB	Aldrin	mg/kg	0.34	0.038							45	0.0017		0.02	
PPCB	Heptachlor epoxide	mg/kg	0.63	0.07							45	0.0017		0.02	
PPCB	Endosulfan I	mg/kg	12000	470							45	0.0017		0.02	
PPCB	Dieldrin	mg/kg	0.36	0.04							45	0.0034		0.039	
PPCB	4,4'-DDE	mg/kg	17	1.9							45	0.0034		0.039	
PPCB	Endrin	mg/kg	610	23							45	0.0034		0.039	
PPCB	Endosulfan II	mg/kg	12000	470							45	0.0034		0.039	
PPCB	4,4'-DDD	mg/kg	24	2.7							45	0.0034		0.039	
PPCB	Endosulfan sulfate	mg/kg	12000	470							45	0.0034		0.039	
PPCB	4,4'-DDT	mg/kg	17	1.9	0.0028		0.0041		BC-SSSB09-16	4	45	0.0034		0.039	
PPCB	Methoxychlor	mg/kg	10000	390	0.13		0.15		BC-SSSB12-14	2	45	0.017		0.023	
PPCB	Endrin ketone	mg/kg	610	23	0.021		0.025		BC-SSSB12-12	2	45	0.0034		0.0044	
PPCB	alpha-Chlordane	mg/kg	16	1.8							45	0.0017		0.02	
PPCB	gamma-Chlordane	mg/kg	16	1.8							45	0.0017		0.02	
PPCB	Toxaphene	mg/kg	5.2	0.58							45	0.17		2	R
PPCB	Aroclor-1016	mg/kg	82	5.5							45	0.034		0.39	
PPCB	Aroclor-1221	mg/kg	2.9	0.32							45	0.068		0.79	R
PPCB	Aroclor-1232	mg/kg	2.9	0.32							45	0.034		0.39	R
PPCB	Aroclor-1242	mg/kg	2.9	0.32							45	0.034		0.39	R
PPCB	Aroclor-1248	mg/kg	2.9	0.32							45	0.034		0.39	R
PPCB	Aroclor-1254	mg/kg	2.9	0.32							45	0.034		0.39	R

Table 3-3
Occurance and Distribution of Chemicals of Potential Concern In Subsurface Soils
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Matrix: Soils >1 ft Depth

Type	Parameter	Unit	Risk Based Concentration		Min. Conc		Max. Conc		Max. Conc. Location	No. Detects	No. Samples	Non-Detects Only		
			Industrial	Residential								Min SQL	Max SQL	
PPCB	Aroclor-1260	mg/kg	2.9	0.32							45	0.034	0.39	R
PPCB	Endrin aldehyde	mg/kg	610	23							45	0.0034	0.039	
MTL	Aluminum	MG/KG	2044000	78000	862		11600		BC-SSSB37-08	45	45			
MTL	Antimony	MG/KG	820	31	11.8		11.8		BC-SSSB20-03	1	35	10	18.3	
MTL	Arsenic	MG/KG	3.8	0.43	0.64	R	10.7	I	BC-SSSB12-14	40	45	0.27	1	R
MTL	Barium	MG/KG	140000	5500	5		94.2		BC-SSSB21-09	45	45			
MTL	Beryllium	MG/KG	4100	160	0.1		1.1		BC-SSSB37-08	10	45	0.1	1.2	
MTL	Cadmium	MG/KG	1000	39	1		11.5		BC-SSSB12-14	20	45	0.47	2.5	
MTL	Calcium	MG/KG			1650		147000		BC-SSSB33-24	45	45			
MTL	Chromium, total	MG/KG	2000000	78000	2.3		100		BC-SSSB15-22	45	45			
MTL	Cobalt	MG/KG	120000	4700	1.5		16.8		BC-SSSB12-14	33	45	0.65	6.6	
MTL	Copper	MG/KG	82000	3100	3.1		311		BC-SSSB12-14	42	45	5.9	7.5	
MTL	Iron	MG/KG	610000	23000	2340		51000	R	BC-SSSB12-14	45	45			
MTL	Lead	MG/KG			1.1		216		BC-SSSB12-14	45	45			
MTL	Magnesium	MG/KG			1500		75900		BC-SSSB34-08	45	45			
MTL	Manganese	MG/KG	41000	1600	52.2		1400		BC-SSSB12-14	45	45			
MTL	Mercury	MG/KG			0.04		0.66		BC-SSSB18-12	8	45	0.04	0.12	
MTL	Nickel	MG/KG	41000	1600	4.7		268		BC-SSSB12-14	19	45	3.8	18.6	
MTL	Potassium	MG/KG			151		1340		BC-SSSB28-32	38	45	222	603	
MTL	Selenium	MG/KG	10000	390	0.62		0.62		BC-SSSB12-14	1	26	0.4	0.48	
MTL	Silver	MG/KG	10000	390	2.1		2.9		BC-SSSB13-04	8	45	0.57	2.4	
MTL	Sodium	MG/KG									45	308	476	
MTL	Thallium	MG/KG	140	5.5							45	0.2	0.72	
MTL	Vanadium	MG/KG	14000	550	2.9		29.1		BC-SSSB37-08	31	45	1	11.9	
MTL	Zinc	MG/KG	610000	23000	8.2		311		BC-SSSB12-14	29	45	7.3	29.6	
MTL	Cyanide	MG/KG	41000	1600							45	0.51	1.5	

Notes:

This table includes analytical results for all soil samples designated as soil borings and collected from greater than 1 ft depths throughout the entire Beloit Corporation property. Note that organic analytical results have been converted from ug/kg to mg/kg for risk assessment purposes.

1. The EPA Region III Risk Based Concentrations (RBCs) from April 1, 1998 Table are included for both commercial/industrial soil ingestion and residential soil ingestion scenarios. RBCs were not available for the detected parameters Phenanthrene and Benzo(g,h,i)perylene, therefore pyrene RBCs were used as a substitute value. Similarly, endrin was substituted for endrin ketone.
2. Min. and Max. concentrations, max. concentration location, and SQLs for non-detects only are provided for for each analyte analyzed. Blanks in these locations indicate the compound was not detected.
3. Concentrations and SQLs equal to or greater than either the industrial or residential RBC are flagged "I".
4. Concentrations and SQLs equal to or greater than the residential RBC are flagged "R".

Table 3-4
Occurance and Distribution of Chemicals of Potential Concern In Groundwater Collected From Monitoring Wells
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Matrix: Groundwater

Type	Parameter	Unit	Tap Water RBC	Min. Conc		Max. Conc		Max. Conc. Location	No. Detects	No. Samples	Non-Detects Only Min SQL		Non-Detects Only Max SQL	
VOC	Chloromethane	UG/L	1.5	11	*	81	*	BC-GWW38-02	3	112	10	*	250	*
VOC	Bromomethane	UG/L	8.5							112	10	*	250	*
VOC	Vinyl chloride	UG/L	0.019							112	10	*	250	*
VOC	Chloroethane	UG/L	3.6							112	10	*	250	*
VOC	Methylene chloride	UG/L	4.1							112	10	*	250	*
VOC	Acetone	UG/L	3700							112	10		250	
VOC	Carbon disulfide	UG/L	1000	2		2		BC-GWW22B-01	1	112	10		250	
VOC	1,1-Dichloroethene	UG/L	0.044	1	*	26	*	BC-GWW48C-04	12	112	10	*	250	*
VOC	1,1-Dichloroethane	UG/L	800	1		15		BC-GWW47C-04	8	112	10		250	
VOC	1,2-Dichloroethene (total)	UG/L	55	2		480	*	BC-GWW23B-02	9	112	10		250	*
VOC	Chloroform	UG/L	0.15							112	10	*	250	*
VOC	1,2-Dichloroethane	UG/L	0.12	320	*	320	*	BC-GWW23B-01	1	112	10	*	250	*
VOC	2-Butanone	UG/L	1900							112	10		250	
VOC	1,1,1-Trichloroethane	UG/L	540	2		160		BC-GWW21B-02	41	112	10		250	
VOC	Carbon tetrachloride	UG/L	0.16	3	*	3	*	BC-GWW47C-04	1	112	10	*	250	*
VOC	Bromodichloromethane	UG/L	0.17							112	10	*	250	*
VOC	1,2-Dichloropropane	UG/L	0.16							112	10	*	250	*
VOC	cis-1,3-Dichloropropene	UG/L	0.077							112	10	*	250	*
VOC	Trichloroethene	UG/L	1.6	1		160	*	BC-GWW48C-04	31	112	10	*	250	*
VOC	Dibromochloromethane	UG/L	0.13							112	10	*	250	*
VOC	1,1,2-Trichloroethane	UG/L	0.19							112	10	*	250	*
VOC	Benzene	UG/L	0.36							112	10	*	250	*
VOC	trans-1,3-Dichloropropene	UG/L	0.077							112	10	*	250	*
VOC	Bromoform	UG/L	2.3							112	10	*	250	*
VOC	4-Methyl-2-pentanone	UG/L	2900							112	10		250	
VOC	2-Hexanone	UG/L	1500							112	10		250	
VOC	Tetrachloroethene	UG/L	1.1	3	*	4300	*	BC-GWW23-02	32	112	10	*	10	*
VOC	1,1,2,2-Tetrachloroethane	UG/L	0.053							112	10	*	250	*
VOC	Toluene	UG/L	750							112	10		250	
VOC	Chlorobenzene	UG/L	35							112	10		250	*
VOC	Ethylbenzene	UG/L	1300							112	10		250	
VOC	Styrene	UG/L	1600							112	10		250	
VOC	Xylenes (total)	UG/L	12000							112	10		250	
SVOC	Phenol	UG/L	22000	2		2		BC-GWW41-02	1	48	10		10	
SVOC	bis(2-Chloroethyl) ether	UG/L	0.061							48	10	*	10	*
SVOC	2-Chlorophenol	UG/L	180							48	10		10	
SVOC	1,3-Dichlorobenzene	UG/L	14							48	10		10	
SVOC	1,4-Dichlorobenzene	UG/L	0.47							48	10	*	10	*

Table 3-4
Occurance and Distribution of Chemicals of Potential Concern In Groundwater Collected From Monitoring Wells
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Matrix: Groundwater

Type	Parameter	Unit	Tap Water RBC	Min. Conc	Max. Conc	Max. Conc. Location	No. Detects	No. Samples	Non-Detects Only Min SQL		Non-Detects Only Max SQL	
SVOC	1,2-Dichlorobenzene	UG/L	64					48	10		10	
SVOC	2-Methylphenol	UG/L	1800					48	10		10	
SVOC	bis(2-Chloroisopropyl)ether	UG/L	0.26					48	10	*	10	*
SVOC	4-Methylphenol	UG/L	180					48	10		10	
SVOC	N-Nitroso-di-n-propylamine	UG/L	0.0096					48	10	*	10	*
SVOC	Hexachloroethane	UG/L	0.75					48	10	*	10	*
SVOC	Nitrobenzene	UG/L	18					48	10		10	
SVOC	Isophorone	UG/L	70					48	10		10	
SVOC	2-Nitrophenol	UG/L						48	10		10	
SVOC	2,4-Dimethylphenol	UG/L	730					48	10		10	
SVOC	bis(2-Chloroethoxy)methane	UG/L						48	10		10	
SVOC	2,4-Dichlorophenol	UG/L	110					48	10		10	
SVOC	1,2,4-Trichlorobenzene	UG/L	190					48	10		10	
SVOC	Naphthalene	UG/L	1500					48	10		10	
SVOC	4-Chloroaniline	UG/L	150					48	10		10	
SVOC	Hexachlorobutadiene	UG/L	0.14					48	10	*	10	*
SVOC	4-Chloro-3-methylphenol	UG/L						48	10		10	
SVOC	2-Methylnaphthalene	UG/L	1500					48	10		10	
SVOC	Hexachlorocyclopentadiene	UG/L	0.15					48	10	*	10	*
SVOC	2,4,6-Trichlorophenol	UG/L	6.1					48	10	*	10	*
SVOC	2,4,5-Trichlorophenol	UG/L	3700					48	24		25	
SVOC	2-Chloronaphthalene	UG/L	490					48	10		10	
SVOC	2-Nitroaniline	UG/L						48	24		25	
SVOC	Dimethylphthalate	UG/L	370000	1	1	BC-GWW26C-01	1	48	10		10	
SVOC	Acenaphthylene	UG/L	1500					48	10		10	
SVOC	2,6-Dinitrotoluene	UG/L	37					48	10		10	
SVOC	3-Nitroaniline	UG/L						48	24		25	
SVOC	Acenaphthene	UG/L	2200					48	10		10	
SVOC	2,4-Dinitrophenol	UG/L	73					48	24		25	
SVOC	4-Nitrophenol	UG/L	290					48	24		25	
SVOC	Dibenzofuran	UG/L	24					48	10		10	
SVOC	2,4-Dinitrotoluene	UG/L	73					48	10		10	
SVOC	Diethylphthalate	UG/L	29000	1	2	BC-GWW26C-01	3	48	10		10	
SVOC	4-Chlorophenyl-phenylether	UG/L						48	10		10	
SVOC	Fluorene	UG/L	1500					48	10		10	
SVOC	4-Nitroaniline	UG/L						48	24		25	
SVOC	4,6-Dinitro-2-methylphenol	UG/L	3.7					48	24	*	25	*
SVOC	N-nitrosodiphenylamine	UG/L	14					48	10		10	

Table 3-4
Occurance and Distribution of Chemicals of Potential Concern In Groundwater Collected From Monitoring Wells
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Matrix: Groundwater

Type	Parameter	Unit	Tap Water RBC	Min. Conc		Max. Conc		Max. Conc. Location	No. Detects	No. Samples	Non-Detects Only Min SQL		Non-Detects Only Max SQL	
SVOC	4-Bromophenyl-phenylether	UG/L								48	10		10	
SVOC	Hexachlorobenzene	UG/L	0.0066							48	10	*	10	*
SVOC	Pentachlorophenol	UG/L	0.56							48	24	*	25	*
SVOC	Phenanthrene	UG/L	1100							48	10		10	
SVOC	Anthracene	UG/L	11000							48	10		10	
SVOC	Di-n-butylphthalate	UG/L	3700	1		1		BC-GWW26C-01	2	48	10		10	
SVOC	Fluoranthene	UG/L	1500							48	10		10	
SVOC	Pyrene	UG/L	1100							48	10		10	
SVOC	Butylbenzylphthalate	UG/L	7300							48	10		10	
SVOC	3,3'-Dichlorobenzidine	UG/L	0.15							48	10	*	10	*
SVOC	Benzo(a)anthracene	UG/L	0.092							48	10	*	10	*
SVOC	Chrysene	UG/L	9.2							48	10	*	10	*
SVOC	bis(2-ethylhexyl)phthalate	UG/L	4.8							47	10	*	11	*
SVOC	Di-n-octyl Phthalate	UG/L	730							48	10		10	
SVOC	Benzo(b)fluoranthene	UG/L	0.092							48	10	*	10	*
SVOC	Benzo(k)fluoranthene	UG/L	0.92							48	10	*	10	*
SVOC	Benzo(a)pyrene	UG/L	0.0092							48	10	*	10	*
SVOC	Indeno(1,2,3-cd)pyrene	UG/L	0.092							48	10	*	10	*
SVOC	Dibenz(a,h)anthracene	UG/L	0.0092							48	10	*	10	*
SVOC	Benzo(g,h,i)perylene	UG/L	1100							48	10		10	
SVOC	Carbazole	UG/L	3.3							48	10	*	10	*
PPCB	alpha-BHC	UG/L	0.011							52	0.047	*	0.05	*
PPCB	beta-BHC	UG/L	0.037							52	0.047	*	0.05	*
PPCB	delta-BHC	UG/L								52	0.047		0.05	
PPCB	gamma-BHC (Lindane)	UG/L	0.052							52	0.047		0.05	
PPCB	Heptachlor	UG/L	0.0023	0.16	*	0.16	*	BC-GWW26C-01	1	52	0.047	*	0.05	*
PPCB	Aldrin	UG/L	0.0039							52	0.047	*	0.05	*
PPCB	Heptachlor epoxide	UG/L	0.0012							52	0.047	*	0.05	*
PPCB	Endosulfan I	UG/L	220							52	0.047		0.05	
PPCB	Dieldrin	UG/L	0.0042							52	0.094	*	0.1	*
PPCB	4,4'-DDE	UG/L	0.2							52	0.094		0.1	
PPCB	Endrin	UG/L	11							52	0.094		0.1	
PPCB	Endosulfan II	UG/L	220							52	0.094		0.1	
PPCB	4,4'-DDD	UG/L	0.28							52	0.094		0.1	
PPCB	Endosulfan sulfate	UG/L	220							52	0.094		0.1	
PPCB	4,4'-DDT	UG/L	0.2							52	0.094		0.1	
PPCB	Methoxychlor	UG/L	180							52	0.47		0.5	
PPCB	Endrin ketone	UG/L	11							52	0.094		0.1	

Table 3-4
Occurance and Distribution of Chemicals of Potential Concern In Groundwater Collected From Monitoring Wells
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Matrix: Groundwater

Type	Parameter	Unit	Tap Water RBC	Min. Conc		Max. Conc		Max. Conc. Location	No. Detects	No. Samples	Non-Detects Only Min SQL		Non-Detects Only Max SQL	
PPCB	alpha-Chlordane	UG/L	0.19							52	0.047		0.05	
PPCB	gamma-Chlordane	UG/L	0.19							52	0.047		0.05	
PPCB	Toxaphene	UG/L	0.061							52	4.7	*	5	*
PPCB	Aroclor-1016	UG/L	0.96							52	0.94		1	*
PPCB	Aroclor-1221	UG/L	0.033							52	1.9	*	2	*
PPCB	Aroclor-1232	UG/L	0.033							52	0.94	*	1	*
PPCB	Aroclor-1242	UG/L	0.033							52	0.94	*	1	*
PPCB	Aroclor-1248	UG/L	0.033							52	0.94	*	1	*
PPCB	Aroclor-1254	UG/L	0.033							52	0.94	*	1.9	*
PPCB	Aroclor-1260	UG/L	0.033							52	0.94	*	1	*
PPCB	Endrin aldehyde	UG/L	11	0.002		0.005		BC-GWW22C-01	6	52	0.094		0.1	
MTL	Aluminum	UG/L	37000	60.7		126		BC-GWW32-02	3	48	20.3		50	
MTL	Antimony	UG/L	15							48	11.2		50	*
MTL	Arsenic	UG/L	0.045	2.3	*	2.3	*	BC-GWG110-01	1	48	1	*	2	*
MTL	Barium	UG/L	2600	13		229		BC-GWW41-02	48	48				
MTL	Beryllium	UG/L	73							48	0.4		5	
MTL	Cadmium	UG/L	18	2.4		5.8		BC-GWW39-02	5	48	2.3		5	
MTL	Calcium	UG/L		54000		209000		BC-GWW41-02	48	48				
MTL	Chromium, total	UG/L	37000	15		15		BC-GWG108D-01	1	48	7.9		10	
MTL	Cobalt	UG/L	2200	4.9		4.9		BC-GWW15-02	1	48	3.1		52	
MTL	Copper	UG/L	1500	2.9		15		BC-GWW34-02	8	48	2.7		10	
MTL	Iron	UG/L	11000	21		536		BC-GWW35C-02	14	48	15.6		60.5	
MTL	Lead	UG/L		3.4		3.4		BC-GWW05R-01	1	48	1		3	
MTL	Magnesium	UG/L		23600		86300		BC-GWW41-02	48	48				
MTL	Manganese	UG/L	730	13		334		BC-GWW40-02	27	48	2		10	
MTL	Mercury	UG/L		0.32		0.32		BC-GWW03R-02	1	48	0.2		0.2	
MTL	Nickel	UG/L	730	8.6		877	*	BC-GWW35C-02	12	48	8.1		28.1	
MTL	Potassium	UG/L		460		8540		BC-GWW41-02	45	48	608		1780	
MTL	Selenium	UG/L	180							48	2		2	
MTL	Silver	UG/L	180	10		11		BC-GWW15-01	3	48	2.8		10	
MTL	Sodium	UG/L		2170		447000		BC-GWW41-02	48	48				
MTL	Thallium	UG/L	2.6							48	1		3	*
MTL	Vanadium	UG/L	260							48	4.7		50	
MTL	Zinc	UG/L	11000	1.8		46.7		BC-GWW20B-02	8	48	1.4		16	
MTL	Cyanide	UG/L	730	8		9		BC-GWW26C-01	2	48	5		10	

Notes:
This table includes analytical results for all groundwater samples collected from the entire Beloit Corporation - Blackhawk Facility NPL Site. Blank cells denote that the compound was detected below SQLs. Quantitation limits for each compound can be found in Appendix G of the RI report (Montgomery Watson 1999).

Table 3-4
Occurance and Distribution of Chemicals of Potential Concern In Groundwater Collected From Monitoring Wells
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Matrix: Groundwater

MATRIX	Type	Parameter	Unit	Tap Water RBC	Min. Conc	Max. Conc	Max. Conc. Location	No. Detects	No. Samples	Non-Detects Only: Min SQL	Non-Detects Only: Max SQL

1. The EPA Region III Risk Based Concentrations (RBCs) from April 1, 1998 Table are included for residential water ("tap"water) scenarios. RBCs were not available for the detected parameters Endrin aldehyde, therefore endrin RBCs were used as a surrogate value.
2. Min. and Max. concentrations, max. concentration location, and SQLs for non-detects only are provided for each analyte analyzed. Blanks in these locations indicate the compound was not detected.
3. Concentrations and SQLs equal to or greater than the residential tap water RBC are flagged "*".

Table 3-5
Occurance and Distribution of Chemicals of Potential Concern In Groundwater Collected From Private Wells (RI Only)
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Matrix:	Private Well Water									Non-Detects Only			
Type	Parameter	Unit	Tap Water RBC	Min. Conc		Max. Conc		Max. Conc. Location	No. Detects	No. Samples	Min SQL		Max SQL	
LVOC	1 Chloromethane	UG/L	1.5	0.9		0.9		BC-PW12-01	1	56	1		4	*
LVOC	2 Bromomethane	UG/L	8.5							56	1		4	
LVOC	3 Vinyl chloride	UG/L	0.019							56	1	*	4	*
LVOC	4 Chloroethane	UG/L	3.6							56	1		4	*
LVOC	5 Methylene chloride	UG/L	4.1							56	2		9	*
LVOC	6 Acetone	UG/L	3700							2	5		5	
LVOC	7 Carbon disulfide	UG/L	1000							56	1		4	
LVOC	8 1,1-Dichloroethene	UG/L	0.044	1	*	3	*	BC-PW56-02	3	56	1	*	1	*
LVOC	9 1,1-Dichloroethane	UG/L	800	0.6		3		BC-PW50-01	4	56	1		4	
LVOC	10 cis-1,2-Dichloroethene	UG/L	61							56	1		4	
LVOC	11 trans-1,2-Dichloroethene	UG/L	120							56	1		4	
LVOC	12 Chloroform	UG/L	0.15	0.6	*	10	*	BC-PW25-01	8	56	1	*	4	*
LVOC	13 1,2-Dichloroethane	UG/L	0.12							56	1	*	4	*
LVOC	14 2-Butanone	UG/L	1900							2	5		5	
LVOC	15 Bromochloromethane	UG/L								56	1		4	
LVOC	16 1,1,1-Trichloroethane	UG/L	540	0.5		25		BC-PW56-02	8	56	1		1	
LVOC	17 Carbon tetrachloride	UG/L	0.16							56	1	*	4	*
LVOC	18 Bromodichloromethane	UG/L	0.17							56	1	*	4	*
LVOC	19 1,2-Dichloropropane	UG/L	0.16							56	1	*	4	*
LVOC	20 cis-1,3-Dichloropropene	UG/L	0.077							56	1	*	4	*
LVOC	21 Trichloroethene	UG/L	1.6	0.5		14	*	BC-PW50-01	5	56	1		4	*
LVOC	22 Dibromochloromethane	UG/L	0.13							56	1	*	4	*
LVOC	23 1,1,2-Trichloroethane	UG/L	0.19							56	1	*	4	*
LVOC	24 Benzene	UG/L	0.36							56	1	*	4	*
LVOC	25 trans-1,3-Dichloropropene	UG/L	0.077							56	1	*	4	*
LVOC	26 Bromoform	UG/L	2.3							56	1		4	*
LVOC	27 1,2-Dibromoethane	UG/L	0.00075							56	1	*	4	*
LVOC	28 4-Methyl-2-pentanone	UG/L	2900							55	5		21	
LVOC	29 2-Hexanone	UG/L	1500							2	5		5	
LVOC	30 Tetrachloroethene	UG/L	1.1	0.5		86	*	BC-PW56-02	7	56	1		1	
LVOC	31 1,1,2,2-Tetrachloroethane	UG/L	0.053							56	1	*	4	*
LVOC	32 Toluene	UG/L	750							56	1		4	
LVOC	33 Chlorobenzene	UG/L	35							56	1		4	
LVOC	34 Ethylbenzene	UG/L	1300							56	1		4	
LVOC	35 Styrene	UG/L	1600							56	1		4	
LVOC	36 Xylenes (total)	UG/L	12000							56	1		4	
LVOC	37 1,2-Dibromo-3-chloropropane	UG/L	0.047							12	1	*	1	*
LVOC	38 1,3-Dichlorobenzene	UG/L	14							56	1		4	
LVOC	39 1,4-Dichlorobenzene	UG/L	0.47	0.6	*	0.6	*	BC-PW53-01	1	56	1	*	4	*
LVOC	40 1,2-Dichlorobenzene	UG/L	64							56	1		4	

Table 3-5
Occurance and Distribution of Chemicals of Potential Concern In Groundwater Collected From Private Wells (RI Only)
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Matrix:		Private Well Water								Non-Detects Only			
Type	Parameter	Unit	Tap Water RBC	Min. Conc	Max. Conc	Max. Conc. Location	No. Detects	No. Samples	Min SQL		Max SQL	
LSVOC	101 Phenol	UG/L	22000					7	5		5	
LSVOC	102 bis(2-Chloroethyl)ether	UG/L	0.061					7	5	*	5	*
LSVOC	103 2-Chlorophenol	UG/L	180					7	5		5	
LSVOC	104 2-Methylphenol	UG/L	1800					7	5		5	
LSVOC	105 2,2'-oxybis(1-Chloropropane)	UG/L	0.26					7	5	*	5	*
LSVOC	106 4-Methylphenol	UG/L	180					7	5		5	
LSVOC	107 n-Nitroso-di-n-propylamine	UG/L	0.0096					7	5	*	5	*
LSVOC	108 Hexachloroethane	UG/L	0.75					7	5	*	5	*
LSVOC	109 Nitrobenzene	UG/L	18					7	5		5	
LSVOC	110 Isophorone	UG/L	70					7	5		5	
LSVOC	111 2-Nitrophenol	UG/L						7	5		5	
LSVOC	112 2,4-Dimethylphenol	UG/L	730					7	5		5	
LSVOC	113 bis(2-Chloroethoxy)methane	UG/L						7	5		5	
LSVOC	114 2,4-Dichlorophenol	UG/L	110					7	5		5	
LSVOC	115 1,2,4-Trichlorobenzene	UG/L	190					7	5		5	
LSVOC	116 Naphthalene	UG/L	1500					7	5		5	
LSVOC	117 4-Chloroaniline	UG/L	150					7	5		5	
LSVOC	118 Hexachlorobutadiene	UG/L	0.14					7	5	*	5	*
LSVOC	119 4-Chloro-3-methylphenol	UG/L						7	5		5	
LSVOC	120 2-Methylnaphthalene	UG/L	1500					7	5		5	
LSVOC	121 Hexachlorocyclopentadiene	UG/L	0.15					7	5	*	5	*
LSVOC	122 2,4,6-Trichlorophenol	UG/L	6.1					7	5		5	
LSVOC	123 2,4,5-Trichlorophenol	UG/L	3700					7	20		20	
LSVOC	124 2-Chloronaphthalene	UG/L	490					7	5		5	
LSVOC	125 2-Nitroaniline	UG/L						7	20		20	
LSVOC	126 Dimethyl phthalate	UG/L	370000					7	5		5	
LSVOC	127 Acenaphthylene	UG/L	1500					7	5		5	
LSVOC	128 2,6-Dinitrotoluene	UG/L	37					7	5		5	
LSVOC	129 3-Nitroaniline	UG/L						7	20		20	
LSVOC	130 Acenaphthene	UG/L	2200					7	5		5	
LSVOC	131 2,4-Dinitrophenol	UG/L	73					7	20		20	
LSVOC	132 4-Nitrophenol	UG/L	290					7	20		20	
LSVOC	133 Dibenzofuran	UG/L	24					7	5		5	
LSVOC	134 2,4-Dinitrotoluene	UG/L	73					7	5		5	
LSVOC	135 Diethylphthalate	UG/L	29000					7	5		5	
LSVOC	136 4-Chlorophenyl-phenylether	UG/L						7	5		5	
LSVOC	137 Fluorene	UG/L	1500					7	5		5	
LSVOC	138 4-Nitroaniline	UG/L						7	20		20	
LSVOC	139 4,6-Dinitro-2-methylphenol	UG/L	3.7					7	20	*	20	*
LSVOC	145 N-nitrosodiphenylamine	UG/L	14					7	5		5	
LSVOC	141 4-Bromophenyl-phenylether	UG/L						7	5		5	
LSVOC	142 Hexachlorobenzene	UG/L	0.0066					7	5	*	5	*

Table 3-5
Occurance and Distribution of Chemicals of Potential Concern In Groundwater Collected From Private Wells (RI Only)
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Matrix:		Private Well Water									Non-Detects Only			
Type		Parameter	Unit	Tap Water RBC	Min. Conc	Max. Conc	Max. Conc. Location	No. Detects	No. Samples	Min SQL		Max SQL	
LSVOC	143	Pentachlorophenol	UG/L	0.56					7	20	*	20	*
LSVOC	144	Phenanthrene	UG/L	1100					7	5		5	
LSVOC	145	Anthracene	UG/L	11000					7	5		5	
LSVOC	146	Di-n-butylphthalate	UG/L	3700					7	5		5	
LSVOC	147	Fluoranthene	UG/L	1500					7	5		5	
LSVOC	148	Pyrene	UG/L	1100					7	5		5	
LSVOC	149	Butylbenzylphthalate	UG/L	7300					7	5		6	
LSVOC	150	3,3'-Dichlorobenzidine	UG/L	0.15					7	5	*	5	*
LSVOC	151	Benzo(a)anthracene	UG/L	0.092					7	5	*	5	*
LSVOC	152	Chrysene	UG/L	9.2					7	5		5	
LSVOC	153	bis(2-ethylhexyl)phthalate	UG/L	4.8					7	5	*	6	*
LSVOC	154	Di-n-octyl Phthalate	UG/L	730					7	5		5	
LSVOC	155	Benzo(b)fluoranthene	UG/L	0.092					7	5	*	5	*
LSVOC	156	Benzo(k)fluoranthene	UG/L	0.92					7	5	*	5	*
LSVOC	157	Benzo(a)pyrene	UG/L	0.0092					7	5	*	5	*
LSVOC	158	Indeno(1,2,3-cd)pyrene	UG/L	0.092					7	5	*	5	*
LSVOC	159	Dibenz(a,h)anthracene	UG/L	0.0092					7	5	*	5	*
LSVOC	160	Benzo(g,h,i)perylene	UG/L	1100					7	5		5	

Notes:
This table includes analytical results for all private well - groundwater samples collected from the entire Beloit Corporation - Blackhawk Facility NPL Site during the RI . Blank cells denote that the compound was detected below SQLs. Quantitation limits for each compound can be found in Appendix G of the RI report (Montgomery Watson 199

1. The EPA Region III Risk Based Concentrations (RBCs) from April 1, 1998 Table are included for residential water ("tap"water) scenarios.
2. Min. and Max. concentrations, max. concentration location, and SQLs for non-detects only are provided for each analyte analyzed. Blanks in these locations indicate the compound was not detected.
3. Concentrations and SQLs equal to or greater than the residential tap water RBC are flagged "*"

Table 3-6
Summary of Private Well Results (Pre and Post RI)
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

	1,1,1-Trichloroethane			1,1-Dichloroethane			Chloromethane			Tetrachloroethene			Trichloroethene			1,1-Dichloroethene			Chloroform			1,4-Dichlorobenzene			Methylene chloride			Dichlorodifluoromethane		
Address	Phase I	Phase II	Rem.Act.	Phase I	Phase II	Rem.Act.	Phase I	Phase II	Rem.Act.	Phase I	Phase II	Rem.Act.	Phase I	Phase II	Rem.Act.	Phase I	Phase II	Rem.Act.	Phase I	Phase II	Rem.Act.	Phase I	Phase II	Rem.Act.	Phase I	Phase II	Rem.Act.	Phase I	Phase II	Rem.Act.
908 Blackhawk			NS			NS			NS	0.7		NS			NS			NS			NS			NS			NS			NS
916 Blackhawk			NS	0.7		NS			NS			NS			NS			NS			NS			NS			NS			NS
1012 Blackhawk (1)	2	0.7		0.7						0.7			4	0.9																
1102 Blackhawk (1)	9	7		3	2								14	13	8.8															
1106 Blackhawk			NS			NS			NS			NS			NS			NS			NS			NS			NS		14	NS
1204 Blackhawk (1)																			0.6											
1208 Blackhawk			NS			NS			NS			NS			NS			NS	0.9		NS			NS			NS			NS
1212 Blackhawk			NS			NS			NS			NS			NS			NS	1		NS			NS			NS			NS
1220 Blackhawk			NS			NS			NS			NS			NS			NS	2	5	NS			NS			NS			NS
1310 Blackhawk			NS			NS			NS			NS			NS			NS	10	14	NS			NS			NS			NS
1408 Blackhawk			NS			NS			NS			NS			NS			NS			NS			NS			NS		0.9	NS
407 Dingman			NS			NS			NS			NS			NS			NS			NS			NS			NS		9	NS
410 Kile			NS			NS			NS			NS			NS			NS	2	2	NS			NS			NS			NS
416 Kile		0.9	NS			NS			NS			NS			NS			NS			NS			NS			NS			NS
905 Watts			NS			NS	0.9		NS	0.5		NS			NS			NS	2	1	NS			NS			NS			NS
909 Watts (1)										2	2								2	3										
910 Watts (1)	19	15	15							29	95	140	0.5			2	2													
914 Watts (1)	25	15	6.2							86	68	110				3	2													
918 Watts	9	0.8	NS			NS			NS	9	22	NS			NS	1		NS			NS			NS			NS			NS
1004 Watts	0.5		NS			NS			NS			NS			NS			NS			NS			NS			NS			NS
1117 Watts	1		NS	0.6		NS			NS			NS	3		NS			NS			NS			NS			NS			NS
1200 Watts		1	NS			NS			NS			NS			NS			NS			NS			NS			NS			NS
1314 Watts	0.8		NS			NS			NS			NS	0.5		NS			NS			NS			NS		0.5	NS			NS
407 Central (1)										1																				
900 N. Prairie			NS			NS			NS			NS			NS			NS			NS	0.6		NS			NS			NS

This table presents all volatile organic compounds detected during Phase I and Phase II and Removal Action sampling at the Beloit Corporation - Blackhawk Facility NPL Site. The left column for each compound represents Phase I, the cente column Phase II, and the right column Removal Action data.

(1) - indicates that the well was sampled during the Removal Action sampling event (June 1996).
NS - Not Sampled
All results are reported in ug/L. A blank indicates the compound was not detected at concentrations greater than the laboratory reporting limit. Individual chemical detection limits can be found in Appendix G of the RI report.

All rounds are presented to allow comparison of results over time. Only those groundwater wells and volatiles compounds detected in at least one sample are included here.

Table 3-7
Occurance and Distribution of Chemicals of Potential Concern In Sediments
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Matrix: Sediments			Risk Based Concentration							Non-Detects Only	
Type	Parameter	Unit	Industrial	Residential	Min. Conc	Max. Conc	Max. Conc. Location	No. Detects	No. Samples	Min SQL	Max SQL
VOC	Chloromethane	mg/Kg	440	49					11	0.011	0.051
VOC	Bromomethane	mg/Kg	2900	110					11	0.011	0.051
VOC	Vinyl chloride	mg/Kg	3	0.34					11	0.011	0.051
VOC	Chloroethane	mg/Kg	2000	220					11	0.011	0.051
VOC	Methylene chloride	mg/Kg	760	85					11	0.011	0.051
VOC	Acetone	mg/Kg	204400	7800	0.018	0.16	BC-SD09	5	11	0.011	0.014
VOC	Carbon disulfide	mg/Kg	204400	7800					11	0.011	0.051
VOC	1,1-Dichloroethene	mg/Kg	9.5	1.1					11	0.011	0.051
VOC	1,1-Dichloroethane	mg/Kg	200000	7800					11	0.011	0.051
VOC	1,2-Dichloroethene (total)	mg/Kg	18000	700					11	0.011	0.051
VOC	Chloroform	mg/Kg	940	100					11	0.011	0.051
VOC	1,2-Dichloroethane	mg/Kg	63	7					11	0.011	0.051
VOC	2-Butanone	mg/Kg	1200000	47000	0.004	0.036	BC-SD07	3	11	0.011	0.014
VOC	1,1,1-Trichloroethane	mg/Kg	41000	1600					11	0.011	0.051
VOC	Carbon tetrachloride	mg/Kg	44	4.9					11	0.011	0.051
VOC	Bromodichloromethane	mg/Kg	92	10					11	0.011	0.051
VOC	1,2-Dichloropropane	mg/Kg	84	9.4					11	0.011	0.051
VOC	cis-1,3-Dichloropropene	mg/Kg	32	3.5					11	0.011	0.051
VOC	Trichloroethene	mg/Kg	520	58					11	0.011	0.051
VOC	Dibromochloromethane	mg/Kg	68	7.6					11	0.011	0.051
VOC	1,1,2-Trichloroethane	mg/Kg	100	11					11	0.011	0.051
VOC	Benzene	mg/Kg	200	22					11	0.011	0.051
VOC	trans-1,3-Dichloropropene	mg/Kg	32	3.5					11	0.011	0.051
VOC	Bromoform	mg/Kg	720	81					11	0.011	0.051
VOC	4-Methyl-2-pentanone	mg/Kg	160000	6300					11	0.011	0.051
VOC	2-Hexanone	mg/Kg	82000	3100					11	0.011	0.051
VOC	Tetrachloroethene	mg/Kg	110	12					11	0.011	0.051
VOC	1,1,2,2-Tetrachloroethane	mg/Kg	29	3.2					11	0.011	0.051
VOC	Toluene	mg/Kg	410000	16000					11	0.011	0.051
VOC	Chlorobenzene	mg/Kg	41000	1600					11	0.011	0.051
VOC	Ethylbenzene	mg/Kg	200000	7800	0.15	0.15	BC-SD07	1	11	0.011	0.016
VOC	Styrene	mg/Kg	410000	16000					11	0.011	0.051
VOC	Xylenes (total)	mg/Kg	4100000	160000	0.11	0.11	BC-SD07	1	11	0.011	0.016
SVOC	Phenol	mg/Kg	1200000	47000					11	0.38	13
SVOC	bis(2-Chloroethyl) ether	mg/Kg	5.2	0.58					11	0.38	13

Table 3-7
Occurance and Distribution of Chemicals of Potential Concern In Sediments
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Matrix: Sediments

Type	Parameter	Unit	Risk Based Concentration		Min. Conc	Max. Conc	Max. Conc. Location	No. Detects	No. Samples	Non-Detects Only			
			Industrial	Residential						Min SQL		Max SQL	
SVOC	2-Chlorophenol	mg/Kg	10000	390					11	0.38		13	
SVOC	1,3-Dichlorobenzene	mg/Kg	61000	2300					11	0.38		13	
SVOC	1,4-Dichlorobenzene	mg/Kg	240	27					11	0.38		13	
SVOC	1,2-Dichlorobenzene	mg/Kg	180000	7000					11	0.38		13	
SVOC	2-Methylphenol	mg/Kg	100000	3900					11	0.38		13	
SVOC	bis(2-Chloroisopropyl)ether	mg/Kg	82	9.1					11	0.38		13	R
SVOC	4-Methylphenol	mg/Kg	10000	390	0.11	0.11	BC-SD09	1	11	0.38		13	
SVOC	N-Nitroso-di-n-propylamine	mg/Kg	0.82	0.091					11	0.38	R	13	I
SVOC	Hexachloroethane	mg/Kg	410	46					11	0.38		13	
SVOC	Nitrobenzene	mg/Kg	1000	39					11	0.38		13	
SVOC	Isophorone	mg/Kg	6000	670					11	0.38		13	
SVOC	2-Nitrophenol	mg/Kg							11	0.38		13	
SVOC	2,4-Dimethylphenol	mg/Kg	41000	1600					11	0.38		13	
SVOC	bis(2-Chloroethoxy)methane	mg/Kg							11	0.38		13	
SVOC	2,4-Dichlorophenol	mg/Kg	6100	230					11	0.38		13	
SVOC	1,2,4-Trichlorobenzene	mg/Kg	20000	780					11	0.38		13	
SVOC	Naphthalene	mg/Kg	82000	3100	24	24	BC-SD07	1	11	0.38		0.53	
SVOC	4-Chloroaniline	mg/Kg	8200	310					11	0.38		13	
SVOC	Hexachlorobutadiene	mg/Kg	73	8.2					11	0.38		13	R
SVOC	4-Chloro-3-methylphenol	mg/Kg							11	0.38		13	
SVOC	2-Methylnaphthalene	mg/Kg	82000	3100	48	48	BC-SD07	1	11	0.38		0.53	
SVOC	Hexachlorocyclopentadiene	mg/Kg	14000	550					11	0.38		13	
SVOC	2,4,6-Trichlorophenol	mg/Kg	520	58					11	0.38		13	
SVOC	2,4,5-Trichlorophenol	mg/Kg	200000	7800					11	0.91		33	
SVOC	2-Chloronaphthalene	mg/Kg	160000	6300					11	0.38		13	
SVOC	2-Nitroaniline	mg/Kg							11	0.91		33	
SVOC	Dimethylphthalate	mg/Kg	20000000	780000					11	0.38		13	
SVOC	Acenaphthylene	mg/Kg	82000	3100	0.14	7.6	BC-SD09	2	11	0.38		0.53	
SVOC	2,6-Dinitrotoluene	mg/Kg	2000	78					11	0.38		13	
SVOC	3-Nitroaniline	mg/Kg							11	0.91		33	
SVOC	Acenaphthene	mg/Kg	120000	4700	40	40	BC-SD07	1	11	0.38		0.53	
SVOC	2,4-Dinitrophenol	mg/Kg	4100	160					11	0.91		33	
SVOC	4-Nitrophenol	mg/Kg	16000	630					11	0.91		33	
SVOC	Dibenzofuran	mg/Kg	8200	310	7.4	7.4	BC-SD07	1	11	0.38		0.53	
SVOC	2,4-Dinitrotoluene	mg/Kg	4100	160					11	0.38		13	

Table 3-7
Occurance and Distribution of Chemicals of Potential Concern In Sediments
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Matrix: Sediments

Type	Parameter	Unit	Risk Based Concentration		Min. Conc	Max. Conc		Max. Conc. Location	No. Detects	No. Samples	Non-Detects Only			
			Industrial	Residential							Min SQL		Max SQL	
SVOC	Diethylphthalate	mg/Kg	1600000	63000						11	0.38		13	
SVOC	4-Chlorophenyl-phenylether	mg/Kg								11	0.38		13	
SVOC	Fluorene	mg/Kg	82000	3100	0.046	27		BC-SD09	2	11	0.38		0.53	
SVOC	4-Nitroaniline	mg/Kg								11	0.91		33	
SVOC	4,6-Dinitro-2-methylphenol	mg/Kg	200	7.8						11	0.91		33	R
SVOC	N-Nitrosodiphenylamine	mg/Kg	1200	130						11	0.38		13	
SVOC	4-Bromophenyl-phenylether	mg/Kg								11	0.38		13	
SVOC	Hexachlorobenzene	mg/Kg	3.6	0.4						11	0.38		13	I
SVOC	Pentachlorophenol	mg/Kg	48	5.3						11	0.91		33	R
SVOC	Phenanthrene	mg/Kg	61000	2300	0.28	100		BC-SD09	2	11	0.38		0.53	
SVOC	Anthracene	mg/Kg	610000	23000	0.23	42		BC-SD09	2	11	0.38		0.53	
SVOC	Di-n-butylphthalate	mg/Kg	200000	7800	0.31	0.31		BC-SD06	1	11	0.38		13	
SVOC	Fluoranthene	mg/Kg	82000	3100	0.052	64		BC-SD10	5	11	0.38		0.53	
SVOC	Pyrene	mg/Kg	61000	2300	0.07	84		BC-SD10	5	11	0.38		0.53	
SVOC	Butylbenzylphthalate	mg/Kg	410000	16000						11	0.38		13	
SVOC	3,3'-Dichlorobenzidine	mg/Kg	13	1.4						11	0.38		13	I
SVOC	Benzo(a)anthracene	mg/Kg	7.8	0.87	0.06	38	I	BC-SD09	3	11	0.38		0.53	
SVOC	Chrysene	mg/Kg	780	87	0.06	35		BC-SD09	3	11	0.38		0.53	
SVOC	bis(2-ethylhexyl)phthalate	mg/Kg	410	46						11	0.38		13	
SVOC	Di-n-octyl Phthalate	mg/Kg	41000	1600						11	0.38		13	
SVOC	Benzo(b)fluoranthene	mg/Kg	7.8	0.87	0.23	20	I	BC-SD09	2	11	0.38		0.53	
SVOC	Benzo(k)fluoranthene	mg/Kg	78	8.7	0.36	17	R	BC-SD09	2	11	0.38		0.53	
SVOC	Benzo(a)pyrene	mg/Kg	0.78	0.087	0.075	30	I	BC-SD09	3	11	0.38	R	0.53	R
SVOC	Indeno(1,2,3-cd)pyrene	mg/Kg	7.8	0.87	0.18	10	I	BC-SD09	2	11	0.38		0.53	
SVOC	Dibenz(a,h)anthracene	mg/Kg	0.78	0.087	0.086	5.6	I	BC-SD09	2	11	0.38	R	0.53	R
SVOC	Benzo(g,h,i)perylene	mg/Kg	61000	2300	0.041	12		BC-SD09	3	11	0.38		0.53	
SVOC	Carbazole	mg/Kg	290	32						11	0.38		13	
PPCB	alpha-BHC	mg/Kg	0.91	0.1						11	0.0019		0.0069	
PPCB	beta-BHC	mg/Kg	3.2	0.35						11	0.0019		0.0069	
PPCB	delta-BHC	mg/Kg								11	0.0019		0.0069	
PPCB	gamma-BHC (Lindane)	mg/Kg	4.4	0.49						11	0.0019		0.0069	
PPCB	Heptachlor	mg/Kg	1.3	0.14						11	0.0019		0.0069	
PPCB	Aldrin	mg/Kg	0.34	0.038						11	0.0019		0.0069	
PPCB	Heptachlor epoxide	mg/Kg	0.63	0.07						11	0.0019		0.0069	
PPCB	Endosulfan I	mg/Kg	12000	470						11	0.0019		0.0069	

Table 3-7
Occurance and Distribution of Chemicals of Potential Concern In Sediments
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Matrix: Sediments

Type	Parameter	Unit	Risk Based Concentration		Min. Conc		Max. Conc		Max. Conc. Location	No. Detects	No. Samples	Non-Detects Only	
			Industrial	Residential								Min SQL	Max SQL
PPCB	Dieldrin	mg/Kg	0.36	0.04							11	0.0038	0.013
PPCB	4,4'-DDE	mg/Kg	17	1.9							11	0.0038	0.013
PPCB	Endrin	mg/Kg	610	23							11	0.0038	0.013
PPCB	Endosulfan II	mg/Kg	12000	470							11	0.0038	0.013
PPCB	4,4'-DDD	mg/Kg	24	2.7							11	0.0038	0.013
PPCB	Endosulfan sulfate	mg/Kg	12000	470							11	0.0038	0.013
PPCB	4,4'-DDT	mg/Kg	17	1.9							11	0.0038	0.013
PPCB	Methoxychlor	mg/Kg	10000	390							11	0.019	0.069
PPCB	Endrin ketone	mg/Kg	610	23							11	0.0038	0.013
PPCB	alpha-Chlordane	mg/Kg	16	1.8							11	0.0019	0.0069
PPCB	gamma-Chlordane	mg/Kg	16	1.8							11	0.0019	0.0069
PPCB	Toxaphene	mg/Kg	5.2	0.58							11	0.19	0.69 R
PPCB	Aroclor-1016	mg/Kg	82	5.5							11	0.038	0.13
PPCB	Aroclor-1221	mg/Kg	2.9	0.32							11	0.076	0.27
PPCB	Aroclor-1232	mg/Kg	2.9	0.32							11	0.038	0.13
PPCB	Aroclor-1242	mg/Kg	2.9	0.32							11	0.038	0.13
PPCB	Aroclor-1248	mg/Kg	2.9	0.32							11	0.038	0.13
PPCB	Aroclor-1254	mg/Kg	2.9	0.32							11	0.038	0.13
PPCB	Aroclor-1260	mg/Kg	2.9	0.32							11	0.038	0.13
PPCB	Endrin aldehyde	mg/Kg	610	23							11	0.0038	0.013
MTL	Aluminum	MG/KG	2044000	78000	1150		10600		BC-SD10	11	11		
MTL	Antimony	MG/KG	820	31							11	11.3	24.7
MTL	Arsenic	MG/KG	3.8	0.43	0.48	R	7.3	I	BC-SD10	11	11		
MTL	Barium	MG/KG	140000	5500	6.9		166		BC-SD10	11	11		
MTL	Beryllium	MG/KG	4100	160							11	1.1	2.5
MTL	Cadmium	MG/KG	1000	39	1.2		3.9		BC-SD09	7	11	1.1	1.3
MTL	Calcium	MG/KG			1760		83600		BC-SD10	11	11		
MTL	Chromium, total	MG/KG	2000000	78000	3.6		17.5		BC-SD10	10	11	2.5	2.5
MTL	Cobalt	MG/KG	120000[1]	4700	2.9		8.6		BC-SD09	9	11	2.4	2.5
MTL	Copper	MG/KG	82000	3100	3.4		40.6		BC-SD09	9	11	2.4	2.5
MTL	Iron	MG/KG	610000	23000	3430		20000		BC-SD10	11	11		
MTL	Lead	MG/KG			1.6		94		BC-SD10	11	11		
MTL	Magnesium	MG/KG			1930		43400		BC-SD10	11	11		
MTL	Manganese	MG/KG	41000	1600	53.5		728		BC-SD10	11	11		
MTL	Mercury	MG/KG			0.05		4.1		BC-SD10	9	11	0.05	0.05

Table 3-7
Occurance and Distribution of Chemicals of Potential Concern In Sediments
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Matrix: Sediments			Risk Based Concentration							Non-Detects Only	
Type	Parameter	Unit	Industrial	Residential	Min. Conc	Max. Conc	Max. Conc. Location	No. Detects	No. Samples	Min SQL	Max SQL
MTL	Nickel	MG/KG	41000	1600	5.5	18.8	BC-SD09	8	11	4.5	5.1
MTL	Potassium	MG/KG			150	841	BC-SD10	11	11		
MTL	Selenium	MG/KG	10000	390	0.54	0.85	BC-SD07	2	11	0.22	0.27
MTL	Silver	MG/KG	10000	390					11	2.3	4.9
MTL	Sodium	MG/KG							11	453	990
MTL	Thallium	MG/KG	140	5.5	0.15	0.44	BC-SD09	8	11	0.11	0.12
MTL	Vanadium	MG/KG	14000	550	13.9	22.1	BC-SD09	5	11	11.3	24.7
MTL	Zinc	MG/KG	610000	23000	7.6	156	BC-SD10	11	11		
MTL	Cyanide	MG/KG	41000	1600					11	1.4	3.1

Notes:
This table includes analytical results for all sediment samples from the entire Beloit Corporation - Blackhawk Facility NPL Site . Note that organic analytical results have been converted from ug/kg to mg/kg for risk assessment purposes. Blank cells denote that the compound was detected below SQLs. Quantitation limits for each compound can be found in Appendix G of the RI report (Montgomery Watson 1999).

1. The EPA Region III Risk Based Concentrations (RBCs) from April 1, 1998 Table are included for both commercial/industrial soil ingestion and residential soil ingestion scenarios. RBCs were not available for the detected parameters Phenanthrene and Benzo(g,h,i)perylene, therefore pyrene RBCs were used as a surrogate value. Similarly, napthalene was used as a substitute for Acenaphthylene.
2. Min. and Max. concentrations, max. concentration location, and SQLs for non-detects only are provided for each compound analyzed. Blanks in the min and max conc. locations indicate the compound was not detected.
3. Concentrations and SQLs equal to or greater than either the industrial or residential RBC are flagged "I".
4. Concentrations and SQLs equal to or greater than the residential RBC are flagged "R".

Table 4-1

CHEMICAL TOXICITY VALUES AND ABSORPTION ESTIMATES USED FOR RISK QUANTIFICATION

Baseline Risk Assessment
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Chemical	Reference Dose (mg/kg-day)						Slope Factor (kg-day/mg)			Oral Absorption Estimate (unitless)	Dermal Permeability Constant (cm/hr)	Dermal Absorption Estimate (unitless)
	Inhalation		Oral		Dermal							
	Subchronic	Chronic	Subchronic	Chronic	Subchronic	Chronic	Inhalation	Oral	Dermal			
VOLATILES												
Chloromethane	NI	8.60E-02 E	NI	NI	NI	NI	6.3E-03 E	1.3E-02 H	1.3E-02	0.50	3.7E-03	0.03
Acetone	NI	NI	1.0E+00 H	1.0E-01 I	1.0E+00	1.0E-01	NC	NC	NC	1.00	5.7E-04 e	1
Carbon disulfide	1.0E-01 H	2.0E-01 I	1.0E-01 H	1.0E-01 I	1.0E-01	1.0E-01	NC	NC	NC	0.50	2.4E-02	0.03
1,1-Dichloroethene	NI	NI	9.0E-03 H	9.0E-03 I	9.0E-03	9.0E-03	1.2E+00 I	6.0E-01 I	6.0E-01	1.00	1.6E-02	0.03
1,1-Dichloroethane	1.4E+00 A	1.4E-01 A	1.0E+00 H	1.0E-01 H	1.0E+00	1.0E-01	NI	NI	NI	1.00	8.5E-03	0.03
1,2-Dichloroethene (cis)	NI	NI	1.0E-01 H	1.0E-02 H	1.0E-01	1.0E-02	NC	NC	NC	1.00	9.9E-03	0.03
Chloroform	NI	1.0E-02 R	1.0E-02 H	1.0E-02 I	1.0E-02	1.0E-02	8.1E-02 I	6.1E-03 I	6.1E-03	0.50	8.9E-03	0.03
1,2-Dichloroethane	NI	1.4E-03 E	NI	3.0E-02 E	NI	3.0E-02	9.1E-02 I	9.1E-02 I	9.1E-02	1.00	5.0E-03	0.03
2-Butanone	2.9E+00 H	2.9E-01 I	2.0E+00 H	6.0E-01 I	2.0E+00	6.0E-01	NC	NC	NC	0.50	9.6E-04	1
1,1,1-Trichloroethane	NI	2.9E-01 E	NI	2.0E-02 E	NI	2.0E-02	NC	NC	NC	1.00	1.7E-02	0.03
Carbon tetrachloride	NI	5.7E-04 E	NI	7.0E-04 I	NI	7.0E-04	5.3E-02 I	1.3E-01 I	1.3E-01	0.50		0.03
Trichloroethene	NI	NI	NI	6.0E-03 E	NI	6.0E-03	6.0E-03 E	1.1E-02 E	1.1E-02	1.00	1.6E-02	0.03
Benzene	NI	1.7E-03 E	NI	3.0E-03 E	NI	3.0E-03	2.9E-02 I	2.9E-02 I	2.9E-02	0.90	2.0E-02	0.03
4-Methyl-2-pentanone	2.0E-01 A	2.0E-02 A	8.0E-01 H	8.0E-02 H	8.0E-01	8.0E-02	NC	NC	NC	0.50	1.96E-03 e	0.03
2-Hexanone	NI	1.4E-03 E	NI	4.0E-02 E	NI	4.0E-02	NI	NI	NI	0.50		0.03
Tetrachloroethene	NI	1.4E-01 E	1.0E-01 H	1.0E-02 I	1.0E-01	1.0E-02	2.0E-03 E	5.2E-02 E	5.2E-02	1.00	5.3E-02	0.03
Toluene	NI	1.1E-01 I	2.0E+00 H	2.0E-01 I	2.0E+00	2.0E-01	NC	NC	NC	0.99	4.7E-02	0.03
Ethylbenzene	NI	2.9E-01 I	NI	1.0E-01 I	NI	1.0E-01	NC	NC	NC	0.92	7.8E-02	0.03
Xylenes (mixed)	NI	NI	NI	2.0E+00 I	NI	2.0E+00	NC	NC	NC	0.92	8.5E-02	0.03
Dichlorodifluoromethane	5.7E-01 A	5.7E-02 A	9.0E-01 H	2.0E-01 I	9.0E-01	2.0E-01	NC	NC	NC	0.50	1.2E-02	0.03
SEMIVOLATILES												
Phenol	NI	NI	6.0E-01 H	6.0E-01 I	6.0E-01	6.0E-01	NC	NC	NC	0.98	5.2E-03	1
1,4-Dichlorobenzene	7.1E-01 H	2.3E-01 I	NI	3.0E-02 E	NI	3.0E-02	2.2E-02 E	2.4E-02 H	2.4E-02	1.00	6.7E-02	0.03
2-Methylphenol	NI	NI	5.0E-01 H	5.0E-02 I	5.0E-01	5.0E-02	NI	NI	NI	0.80	9.9E-03	1
4-Methylphenol	NI	NI	5.0E-03 H	5.0E-03 H	5.0E-03	5.0E-03	NI	NI	NI	0.80	9.7E-03	0.03
2,4-Dimethylphenol	NI	NI	2.0E-01 H	2.0E-02 I	2.0E-01	2.0E-02	NI	NI	NI	0.50	1.5E-02	1
Naphthalene	NI	8.6E-04 I	NI	2.0E-02 I	NI	2.0E-02	NC	NC	NC	0.84	7.5E-02	NA
2-Methylnaphthalene	NI	NI	NI	2.0E-02 E	NI	2.0E-02	NC	NC	NC	0.50	7.0E-02 e	0.01
Dimethylphthalate	NI	NI	NI	NI	NI	NI	NC	NC	NC	0.50	ND	1
Acenaphthylene	NI	NI	NI E	NI E	NI	NI	NC	NC	NC	0.50	ND	NA
Acenaphthene	NI	NI	6.0E-01 H	6.0E-02 I	6.0E-01	6.0E-02	NC	NC	NC	0.50	1.5E-01 e	NA
4-Nitrophenol	NI	NI	NI	8.0E-03 E	NI	8.0E-03	NC	NC	NC	0.50	ND	1
Dibenzofuran	NI	NI	NI	4.0E-03 E	NI	4.0E-03	NC	NC	NC	0.50	5.4E-02 e	NA

Table 4-1

Chemical	Reference Dose (mg/kg-day)						Slope Factor (kg-day/mg)			Oral Absorption Estimate	Dermal Permeability Constant	Dermal Absorption Estimate
	Inhalation		Oral		Dermal							
	Subchronic	Chronic	Subchronic	Chronic	Subchronic	Chronic	Inhalation	Oral	Dermal	(unitless)	(cm/hr)	(unitless)
Diethylphthalate	NI	NI	8.0E+00 H	8.0E-01 I	8.0E+00	8.0E-01	NC	NC	NC	0.50	5.0E-03	1
Fluorene	NI	NI	4.0E-01 H	4.0E-02 I	4.0E-01	4.0E-02	NC	NC	NC	0.50	3.6E-01 e	NA
Phenanthrene	NI	NI	NI	NI	NI	NI	NC	NC	NC	0.50	2.7E-01	NA
Anthracene	NI	NI	3.0E+00 H	3.0E-01 I	3.0E+00	3.0E-01	NC	NC	NC	0.50	2.3E-01 e	NA
Di-n-butylphthalate	NI	NI	1.0E+00 H	1.0E-01 I	1.0E+00	1.0E-01	NC	NC	NC	0.90	3.9E-02	1
Fluoranthene	NI	NI	4.0E-01 H	4.0E-02 I	4.0E-01	4.0E-02	NC	NC	NC	0.50	4.5E-01	NA
Pyrene	NI	NI	3.0E-01 H	3.0E-02 I	3.0E-01	3.0E-02	NC	NC	NC	0.50	3.3E-01 e	NA
Butylbenzylphthalate	NI	NI	2.0E+00 H	2.0E-01 I	2.0E+00	2.0E-01	NI	NI	NI	0.90	2.1E-02 e	1
Benzo(a)anthracene	NI	NI	NI	NI	NI	NI	3.1E-01 L	7.3E-01 E	7.3E-01	0.50	1.1E+00	NA
Chrysene	NI	NI	NI	NI	NI	NI	3.1E-03 L	7.3E-03 E	7.3E-03	0.50	1.1E+00	NA
bis(2-ethylhexyl)phthalate	NI	NI	NI	2.0E-02 I	NI	2.0E-02	1.4E-02 E	1.4E-02 I	1.4E-02	0.50	4.3E-02	1
Di-n-octyl Phthalate	NI	NI	2.0E-02 H	2.0E-02 H	2.0E-02	2.0E-02	ND	ND	ND	0.50	2.4E-02 e	1
Benzo(b)fluoranthene	NI	NI	NI	NI	NI	NI	3.1E-01 L	7.3E-01 E	7.3E-01	0.50	1.7E+00	NA
Benzo(k)fluoranthene	NI	NI	NI	NI	NI	NI	3.1E-02 L	7.3E-02 E	7.3E-02	0.50	1.7E+00	NA
Benzo(a)pyrene	NI	NI	NI	NI	NI	NI	3.1E+00 E	7.3E+00 I	7.3E+00	0.50	1.6E+00	NA
Indeno(1,2,3-cd)pyrene	NI	NI	NI	NI	NI	NI	3.1E-01 E	7.3E-01 E	7.3E-01	0.50	2.6E+00	NA
Dibenz(a,h)anthracene	NI	NI	NI	NI	NI	NI	3.1E+00 L	7.3E+00 E	7.3E+00	0.50	3.9E+00	NA
Benzo(g,h,i)perylene	NI	NI	NI	NI	NI	NI	NC	NC	NC	0.50	1.7E+00 e	NA
Carbazole	NI	NI	NI	NI	NI	NI	NI	2.0E-02 H	2.0E-02	0.50		NA
PESTICIDES/PCBs												
Heptachlor	NI	NI	5.0E-04 H	5.0E-04 I	5.0E-04	5.0E-04	4.5E+00 H	4.5E+00 I	4.5E+00	0.50		0.03
Aldrin	NI	NI	3.0E-05 H	3.0E-05 I	3.0E-05	3.0E-05	1.7E+01 I	1.7E+01 I	1.7E+01	0.50		1
4,4'-DDT	NI	NI	5.0E-04 H	5.0E-04 I	5.0E-04	5.0E-04	3.4E-01 I	3.4E-01 I	3.4E-01	0.90		0.03
Methoxychlor	NI	NI	5.0E-03 H	5.0E-03 I	5.0E-03	5.0E-03	ND	ND	ND	0.50		1
Endrin ketone	NI	NI	3.0E-04 H	3.0E-04 I	3.0E-04	3.0E-04	ND	ND	ND	0.50		0.4
PCB	NI	NI	NI	2.0E-05 Ip	NI	2.0E-05	2.0E+00 I	2.0E+00 I	2.0E+00	0.96	3.7E-01 e	0.06
Endrin Aldehyde	NI	NI	3.0E-04 H	3.0E-04 I	3.0E-04	3.0E-04	ND	ND	ND	0.50	1.6E-02	0.03
METALS												
Aluminum	NI	1.0E-03 E	NI E	1.0E+00 E	NI	1.0E-01	NC	NC	NC	0.10	1.0E-03	0.01
Antimony	NI	NI	4.0E-04 H	4.0E-04 I	6.0E-05	6.0E-05	NC	NC	NC	0.15	1.0E-03	0.01
Arsenic	NI	NI	3.0E-04 H	3.0E-04 I	3.0E-04	3.0E-04	1.5E+01 I	1.5E+00 I	1.5E+00	0.95	1.0E-03	0.01
Barium	1.4E-03 A	1.4E-04 A	7.0E-02 H	7.0E-02 I	4.9E-03	4.9E-03	NC	NC	NC	0.07	1.0E-03	0.01
Beryllium	NI	5.7E-06 I	5.0E-03 H	2.0E-03 I	3.5E-05	1.4E-05	8.4E+00 I	NI	NI	0.01		0.01
Cadmium (water)	NI	5.7E-05 E	NI	5.0E-04 I	NI	1.3E-05	6.3E+00 I	NI	NI	0.03	1.0E-03	0.01
Cadmium (food/soil)	NI	5.7E-05 E	NI	1.0E-03 I	NI	5.0E-05	6.3E+00 I	NI	NI	0.05	1.0E-03	0.01
Chromium VI	NI	2.9E-05 I	2.0E-02 H	3.0E-03 I	5.0E-04	7.5E-05	4.1E+01 H	NI	NI	0.03	1.0E-03	0.01
Cobalt	NI	NI	NI	6.0E-02 E	NI	6.0E-02	NC	NC	NC	0.80	4.0E-04	0.01
Copper	NI	NI	3.7E-02 H	3.7E-02 H	1.1E-02	1.1E-02	NC	NC	NC	0.30	1.0E-03	0.01
Lead	NI	NI	NI	NI	NI	NI	NI	NI	NI	0.15	4.0E-06	0.01
Manganese	NI	1.4E-05 I	1.4E-01 H	1.4E-01 I	5.6E-03	5.6E-03	NC	NC	NC	0.04	1.0E-03	0.01
Mercury	8.6E-05 H	8.6E-05 I	3.0E-04 E	3.0E-04 E	3.0E-04	3.0E-04	NC	NC	NC	0.80	1.0E-03	0.01
Nickel	NI	NI	2.0E-02 H	2.0E-02 I	8.0E-04	8.0E-04	NI	NI	NI	0.04	1.0E-04	0.01

Table 4-1

Chemical	Reference Dose (mg/kg-day)						Slope Factor (kg-day/mg)			Oral Absorption Estimate (unitless)	Dermal Permeability Constant (cm/hr)	Dermal Absorption Estimate (unitless)
	Inhalation		Oral		Dermal							
	Subchronic	Chronic	Subchronic	Chronic	Subchronic	Chronic	Inhalation	Oral	Dermal			
Selenium	NI	NI	5.0E-03 H	5.0E-03 I	5.0E-03	5.0E-03	NC	NC	NC	0.80	1.0E-03	0.01
Silver	NI	NI	5.0E-03 H	5.0E-03 I	2.0E-04	2.0E-04	NC	NC	NC	0.04	6.0E-04	0.01
Thallium	NI	NI	8.0E-04 E	8.0E-05 E	8.0E-04	8.0E-05	NC	NC	NC	1.00	1.0E-03	0.01
Vanadium	NI	NI	7.0E-03 H	7.0E-03 H	1.8E-04	1.8E-04	NC	NC	NC	0.03	1.0E-03	0.01
Zinc	NI	NI	3.0E-01 H	3.0E-01 I	3.0E-01	3.0E-01	NC	NC	NC	1.00	6.0E-04	0.01
Cyanide	NI	NI	2.0E-02 H	2.0E-02 I	2.0E-02	2.0E-02	NC	NC	NC	1.00	1.0E-03	0.01

Notes:

Toxicity values were obtained from the U.S.EPA's Integrated Risk Information System (IRIS) (searched January 2000) and U.S.EPA's "Health Assessment Summary Tables" (HEAST) FY1997. When a value was not available, provisional values were used as referenced in the Region 3 Risk-Based Concentration Table (download January 2000). Both subchronic and chronic reference doses are presented for the noncarcinogenic effects of a chemical. Subchronic reference doses are used to represent the toxic potency of a chemical if the duration of exposure is less than seven years. Chronic reference doses are used to represent the toxic potency of a chemical when the exposure duration is greater than seven years.

Chemical-specific dermal permeability constants were obtained from the U.S. EPA's Supplemental Guidance to RAGS, Vol. 1: Dermal Risk Assessment: Interim Guidance. As required by the U.S. EPA, when the chemical-specific information is not available, values were estimated (e) using the following equation provided on page 5-49 of the U.S. EPA's report entitled "Dermal Exposure Assessment (DEA): Principles and Applications" (U.S. EPA 1992).

Log DPC = -2.72 + 0.71 Log Kow - 0.0061 MW
Where
DPC = Dermal Permeability Constant (cm/hr)
Kow = Octanol/Water Partition Coefficient (dimensionless)
MW = Molecular Weight (g/mole)

Reference doses and slope factors designated for the dermal route of exposure are not available from IRIS or HEAST, but rather are calculated from the corresponding toxicity values for the oral route of exposure. The oral toxicity values which are based on an administered dose are used in conjunction with oral absorption estimates, to estimate absorbed dose toxicity values, based on an absorbed (in contrast to an administered) level of chemical. All chemical dose estimates for the dermal route of exposure are based on absorbed chemical levels. The following relationships were used to derive dermal toxicity levels:

Oral Reference Dose (administered) x Oral Absorption Estimate = Dermal Reference Dose (absorbed)
Oral Slope Factor (administered) / Oral Adsorption Estimate = Dermal Slope Factor (absorbed)

This above approach was used only when the absorption of the chemical was estimated to be less than 50 %, which is in accordancne with current U.S. EPA guidance (personnal communication with Dr. Mark Johnson USEPA January 2000). All oral absorbption estiamtes were assumed to be based on administered doses based on a review of available data in IRIS.

The dermal absorption estimates were determined based IEPA guidelines (IEPA 1994), which use a method developed by McKone (1991) to select a particular default value. This method is used for all compounds other than PAHs unless there is chemical- specific data available (e.g., PCBs). For PCBs the chemical specific data obtained from the DEA guidance manual (EPA 1992) was used to estimate the dermal absorption value (6%).

The following are footnotes (listed to the right of the value) for the toxicity values provided. This table of toxicity valuse has been tailored to the list of CPCs detected at the site, but was developed from a master table of toxicity factors. Therefore, there may be many footnotes which will not appear next to any of the toxicity value presented:

I = IRIS
Ip = Rfd for Aroclor 1254 from IRIS used to present Aroclors at site.
H = HEAST
E = Provisional values from National Center for Exposure Assessment (NCEA) as referecned in the USEPA Region 3 Risk-Based Concentration Table.
R = No inhlation value was available for cloroform, so the value provided in the USEPA Region 9 Preliminary Remediation Goal (Goal) Table 10/99 based on oral to inhalation route etrpolation was used.
L = The inhalation slope factors for PAHs were calculated by using the inhalation slope factor for Benzo(a)pyrene * relative potency factor.
US EPA, July 1993. *Provisional Guidance for Quantitative Risk Assessment of Polycyclic Aromatic Hydrocarbons.* Office of Research and Development, EPA/600/R-93/089.
ND = No value found in IRIS or HEAST
Neg = Negligible volatilization
VF = Volatilization Factor
a = Value under review, by IRIS (value presented is from HEAST)

b = Value withdrawn, by IRIS
c = Data inadequate/unverifiable by IRIS

Table 4-1

Chemical	Reference Dose (mg/kg-day)						Slope Factor (kg-day/mg)			Oral Absorption Estimate	Dermal Permeability Constant	Dermal Absorption Estimate
	Inhalation		Oral		Dermal							
	Subchronic	Chronic	Subchronic	Chronic	Subchronic	Chronic	Inhalation	Oral	Dermal	(unitless)	(cm/hr)	(unitless)

c = Data inadequate/unverifiable by IRIS
d = Data inadequate for quantitative risk assessment per HEAST
e = Value estimated
n = None, per IRIS
p = Proposed, per IRIS

s = Chronic value used as a conservative surrogate for subchronic value.
NR = Not relevant because the Lead Uptake Biokinetic Model is used to estimate risks due to lead exposure.
u = Value converted from unit risk provided in the reference (mg/m3 for reference doses, or ug/m3 for slope factors) to dose (mg/kg-day)
1 = No values available; dichlorodifluoromethane used as a substitute
2 = No values available; xylene used as a substitute
3 = Pre 1994 HEAST value used because no value is listed in IRIS, the 1994 HEAST or available from ECAO. These values were used as best professional judgment to represent the toxicity of the compound.
4 = The reference dose for naphthalene is used to represent the toxicity of noncarcinogenic PAHs which do not have a reference dose.
5 = Slope factors were developed for other carcinogenic PAHs utilizing benzo(a)pyrene relative potency factors (RPFs);
(footnotes 6 through 10 reserved)

Chemical Absorption footnotes:
11 = U.S.EPA Technical Support Document 1990, based on lead uptake model
12 = Health Effects Assessment (HEA), 1984
13 = Health & Environmental Effects Profile (HEEP), 1985
14 = Drinking Water Criteria Document (DWCD), 1986
15 = Health & Environmental Effects Document (HEED), 1986
16 = Drinking Water Health Advisory, 1987
17 = HEED, 1987
18 = HEA, 1988
19 = Agency for Toxic Substances & Disease Registry (ATSDR), 1988, 1989, 1992
20 = HEA, 1987, 1989
21 = HEED, 1989
22 = Memorandum from K.A. Hammerstrom (ORD/OHEA/EAG) to L. Woodruff (reg. X), 11/26/90
23 = Ambient Water Quality Criteria Document (AWQCD), 1980
24 = Toxicology and Biological Monitoring of Metals in Humans (Crason, 1986)
25 = Dermal Exposure Assessment: Principles and Applications (EPA/600/8-91/011B, Interim Report)
26 = Supplemental Guidance for Risk Assessment Guidance for Superfund (RAGS, Vol. 1): Dermal Risk Assessment Interim Guidance, 8/18/92

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TABLE 4-2

INFORMATION FOR CARCINOGENS EXCEEDING 10^{-6} RISK LEVEL

Compound	Critical Health Effect (Oral)	Critical Health Effect (Inhalation)	Weight of Evidence (Class)
Chloroform	fatty cyst formation in liver, kidney tumors	liver	B2
Trichloroethylene	liver tumors	lung and liver tumors	NC
Tetrachloroethylene	hepatotoxicity	liver carcionomas and adenomas, and leukemia	NC
Arsenic	Hyperpigmentation, keratosis and possible vascular complications	lung cancer	A
Benzo(a)pyrene	forestomach, squamous cell papillomas and carcinomas	NA	B2

NA Not available

NC EPA has not assigned a current weight-of-evidence classification to this compound

Table 5-1
Summary of Exposure Point Concentrations
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

	Maximum Concentration (mg/kg or mg/L)											
	On-Site All depths	On-Site surface	On-Site 0-10 ft	Off-Site All depths	Off-Site surface	Sediment Maximum	Monitoring Wells	Private Wells				
								All Wells	PW[1]	PW[2]	PW[3]	PW[4]
VOLATILES												
Chloromethane							0.081	**0.0009**				**0.0009**
Methylene chloride								**0.0005**				**0.0005**
Acetone	0.089	0.089	0.089			0.16						
Carbon disulfide				0.011			0.002					
1,1-Dichloroethene							0.026	**0.002**	**0.0018**			
1,1-Dichloroethane	0.015						0.015	**0.002**		**0.0018**		**0.0007**
1,2-Dichloroethene (cis)							0.48					
Chloroform				0.001				**0.012**			**0.012**	
1,2-Dichloroethane							0.32					
2-Butanone	0.008			0.12		0.036						
1,1,1-Trichloroethane	0.003						0.16	**0.016**	**0.0163**	**0.008**		**0.002**
Carbon tetrachloride							0.003					
Trichloroethene							0.16	**0.012**		**0.0119**		**0.004**
Benzene				0.004								
4-Methyl-2-pentanone				0.009								
2-Hexanone	0.004			0.02								
Tetrachloroethene	0.16	0.008	0.008				4.3	0.0495	0.0495			0.0042
Toluene	0.006	0.006	0.006	0.003								
Ethylbenzene	0.008		0.008			0.15						
Xylenes (mixed)	0.25		0.25			0.11						
Dichlorodifluoromethane								**0.014**				**0.014**
SEMIVOLATILES												
Phenol	0.19						0.002					
1,4-Dichlorobenzene								**0.0006**				**0.0006**
2-Methylphenol	0.17											
4-Methylphenol	0.58					0.11						
2,4-Dimethylphenol	0.39											
Naphthalene	3.1		0.075			24						
2-Methylnaphthalene	2.1					48						
Dimethylphthalate							0.001					
Acenaphthylene						7.6						
Acenaphthene n	3.5	0.23	0.7			40						
4-Nitrophenol	0.1	0.1	0.1									
Dibenzofuran	1.4	0.095	0.19			7.4						
Diethylphthalate							0.002					
Fluorene n	2.5	0.19	0.38			27						
Phenanthrene n	27	1.6	1.6	0.33	0.32	100						
Anthracene n	4.8	0.46	0.46	0.075	0.075	42						
Di-n-butylphthalate				0.38	0.38	0.31	0.001					
Fluoranthene n	57	2.5	2.5	0.52	0.52	64						
Pyrene n	51	1.8	1.8	0.33	0.33	84						
Butylbenzylphthalate				2	2							
Benzo(a)anthracene c	56	1	1	0.25	0.25	38						
Chrysene c	54	1.4	1.4	0.27	0.27	35						
bis(2-ethylhexyl)phthalate	2.1	0.21	0.55	0.19	0.19							
Di-n-octyl Phthalate	0.15	0.15	0.15									
Benzo(b)fluoranthene c	130	1.7	1.7	0.32	0.32	20						
Benzo(k)fluoranthene c	130	1.7	1.7	0.14	0.14	17						
Benzo(a)pyrene c	57	1	1	0.24	0.24	30						
Indeno(1,2,3-cd)pyrene c	57	0.7	0.78	0.24	0.24	10						
Dibenz(a,h)anthracene c	9.2	0.11	0.11	0.068	0.068	5.6						
Benzo(g,h,i)perylene n	73	0.77	0.83	0.25	0.25	12						
Carbazole	2.5	0.19	0.19									
PESTICIDES/PCBs												
Heptachlor	0.001						0.00016					
Aldrin	0.0018	0.0018	0.0018									
4,4'-DDE												
Endrin												
4,4'-DDT	0.0041	0.0032	0.0032									
Methoxychlor	0.15											
Endrin ketone	0.025											
PCB	0.36	0.36	0.36									
Endrin Aldehyde							0.000005					

Table 5-1
Summary of Exposure Point Concentrations
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

	Maximum Concentration (mg/kg or mg/L)											
	On-Site All depths	On-Site surface	On-Site 0-10 ft	Off-Site All depths	Off-Site surface	Sediment Maximum	Monitoring Wells	Private Wells				
								All Wells	PW[1]	PW[2]	PW[3]	PW[4]
METALS												
Aluminum	12900	12900	12900	4900	3590	10600	0.126					
Antimony	11.8	8.7	11.8	94	13							
Arsenic	10.7	5.1	5.1	25.5	4.4	7.3	0.0025					
Barium	128	128	128	216	75.3	166	0.229					
Beryllium	1.1	0.62	1.1									
Cadmium (water)							0.0058					
Cadmium (food/soil)	11.5	4.3	4.3	62.3	13.4	3.9						
Chromium III	73.4		73.4									
Chromium VI	100	73.4		14200	2650	17.5	0.015					
Cobalt	16.8	8.1	8.1	1160	163	8.6	0.0049					
Copper	1550	1550	1550	335	138	40.6	0.015					
Iron	51000	16900	17400	308000	59900	20000	0.869					
Lead	827	827	827	69.5	69.5	94	0.0034					
Manganese	1400	681	681	1140	412	728	0.367					
Mercury	0.66	0.39	0.39	0.26	0.07	4.1	0.00032					
Nickel	268	65.9	65.9	929	171	18.8	0.877					
Selenium	0.71	0.71	0.71			0.85	0.011					
Silver		2.9	2.9	40.7	5.4							
Thallium						0.44						
Vanadium	36.5	36.5	36.5	4660	894	22.1						
Zinc	311	130	130	755	755	156	0.0467					
Cyanide	0.94	0.94	0.94				0.009					

All soil results are in mg/kg, all aqueous results are in mg/L. Blanks in the table refer to those analytes which were not detected in the medium. Refer to Tables 3-2 through 3-5 abd 3-7 for the range of detection limits for each analyte not detected. Results for each area have been sorted as follows:

All soil boring samples are included except for those from beneath pavement (or buildings) have been excluded for risk assessment purposes, except as noted.

All depths - The maximum detected concentration for a given compound in all the soil samples as noted above.
Surface - The maximum detected concentration of all surface samples only (i.e., 0-8 ft and not beneath pavement or buildings).
0-10 ft - The maximum detected concentration of all soil samples from 0-10 ft, including those beneath pavement or buildings.
2nd Max - The second highest concentration for a given compound in all soil samples as noted above.

Footnotes:

For those wells where analytes have been detected in the past two rounds of sampling, the average concentration within the past affected well is used to represent the exposure point concentration. The **bolded private well concentrations** represent the average concentrations detected in earlier three rounds of sampling. The most current round(s) of sampling where the analyte was analyzed, it was not detected. Therefore, the exposure estimates provided are more for informational purposes to reflect past exposure levels, and not current levels of exposure.

PW[1]. Private wells with no point of use treatment system (Hypothetical) for specific Southern Blackhawk Subdivision Residents that have had point of use treatment systems installed by the IEPA. (See table D-2)

PW[2]. Private wells with no point of use treatment system (Hypothetical) for specific Eastern Blackhawk Subdivision Residents that have had point of use treatment systems installed by the IEPA. (See Table D-3)

PW[3]. Private wells with no point of use treatment system for specific Northern Blackhawk Subdivision Residents that do not have point-of-use groundwater treatment systems, and have chloroform affected groundwater. (See Table D-4)

PW[4]. Other private wells with no point of use treatment systems for specific Blackhawk Subdivision Residents that do not have point-of-use groundwater treatment systems. 112 Blackhawk is currently the only other well showing detects of organic analytes based on the current sampling results. (See Table D-5)

TABLE 5-2

Equations Used for Quantitation of Exposure Estimates
Beloit Corporation - Rockton Facility
Rockton, Illinois

Dermal Contact with Contaminants in Soil or Sediment

$$\text{Absorbed Dose (mg/kd-day)} = \frac{CS \times CF \times SA \times AF \times ABS \times FC \times EF \times ED}{BW \times AT}$$

CS = Chemical concentrations in soil or sediment (mg/kg)
CF = Conversion factor (10^{-6} kg/mg)
SA = Skin surface area available for contact (cm^2/event)
AF = Soil to skin adherence factor (mg/cm^2)
ABS = Absorption factor (unitless)
FC = Fraction of soil from contaminated areas
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (period over which exposure is averaged-days)

Incidental Ingestion of Contaminants in Soil or Sediment

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times CF \times FI \times EF \times ED}{BW \times AT}$$

CS = Chemical concentrations in soil or sediment (mg/kg)
IR = Ingestion rate (mg/day)
CF = Conversion factor (10^{-6} kg/mg)
FI = Fraction ingested from contaminated source (unitless)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (period over which exposure is averaged-days)

Inhalation of Fugitive Soil Emissions

$$\text{Intake (mg/kg-day)} = \frac{CS \times IR \times DS \times FC \times EF \times ED}{BW \times AT}$$

CS = Chemical concentration in soil (mg/kg)
IR = Inhalation rate (m^3/day)
DC = Dust concentration (mg/m^3)
FC = Fraction from contaminated source (unitless)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (period over which exposure is averaged - days)

TABLE 5-2

Incidental Ingestion of Chemicals in Groundwater

$$\text{Intake (mg/kg-day)} = \frac{CW \times IR \times EF \times ED}{BW \times AT}$$

CW = Contaminant concentration in water (mg/L)
IR -Water ingestion rate (L/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (period over which exposure is averaged-days)

Incidental Ingestion of Contaminants in Surface Water

$$\text{Intake (mg/kg-day)} = \frac{CW \times IR \times ET \times EF \times ED}{BW \times AT}$$

CW = Chemical concentration in water (mg/L)
IR = Ingestion rate (L/hr)
ET = Exposure time (hours/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (period over which exposure is averaged-days)

Dermal Absorption of Chemicals from Surface Water or Groundwater

$$\text{Absorbed dose (mg/kg-day)} = \frac{CW \times SA \times PC \times ET \times EF \times ED \times CF}{BW \times AT}$$

CW = Chemical concentration in water (mg/L)
SA = Skin surface area available for contact (cm^2)
PC = Chemical-specific dermal permeability constant (cm/hour)
ET = Exposure time (hours/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
CF = Volumetric conversion factor for water (10^{-3} L/cm^3)
BW = Body weight (kg)
AT = Averaging time (period over which exposure is averaged-days)

Inhalation of Volatiles Released from Groundwater While Showering

$$\text{Intake (mg/kg-day)} = \frac{CA \times IR \times ET \times EF \times ED}{BW \times AT}$$

CA = Modeled - See Appendix C
IR = Inhalation rate (m^3/hr) - See Appendix C
ET = Exposure time (hours/day) - See Appendix C
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (period over which exposure is averaged--days)

General Note:
The equations presented were used to calculate chemical intakes or absorbed doses for the pathway and route of exposure indicated. Refer to Table 5-3 for the exposure factors (e.g., EF, BW, etc.) used in conjunction with these equations to quantitate exposure estimates.

MWK/vlr/ndj/JAH/SLG
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TABLE 5-3

Exposure Factors Used for the Calculation of Exposure Estimates
Beloit Corporation - Rockton Facility
Rockton, Illinois

	Construction Worker	Child Resident/ Trespasser	Employee	Nearby Resident
Receptor Characteristics				
Age Bracket (years)	17-70	7 to 16	17-70	0 to 30
Body Weight (kg)	70(b1)	40(a)	70(b1)	59(b2)
Exposure Duration (years)	1.0(c1)	10(c2)	25(b1)	30(d)
Averaging Time (days)				
Noncancer Type Effects	365	3,650	9,125	10,950
Cancer Type Effects	25,550	25,550	25,550	25,550
Chemical Characteristics				
Dermal Permeability Constant (cm/hr)	--	Chem. Specific See Table 4-1	--	Chem. Specific See Table 4-1
Dermal Absorption Estimates (unitless)	Chem. Specific See Table 4-1	Chem. Specific See Table 4-1	Chem. Specific See Table 4-1	Chem. Specific See Table 4-1
Oral Absorption Estimates (unitless)	Chem. Specific See Table 4-1	Chem. Specific See Table 4-1	Chem. Specific See Table 4-1	Chem. Specific See Table 4-1
Soil/Sediment				
Skin Surface Area Available for Contact (cm^2)	5,800(e1)	4,700(e2)	5,800(e1)	5,800(e1)
Soil Ingestion Rate (mg/day)	480(b1)	100(b1)	50(b1)	120(b3)
Soil to Skin Adherence Factor (mg/cm^2)	1.0(f)	1.0(f)	1.0(f)	1.0(f)
Fraction Ingested/Contacted From Contaminated Source (unitless)	1.0(g1)	1.0(g1) 0.25 (current)/1.0 (future)(g1)		1.0 (g1)
Exposure Frequency (days/year)	45(h1)	70(h2)	250 (b1)	350(b1)
Surface Water				
Ingestion Rate	---	0.05(L/hr)(i)	---	---
Exposure Time (hours/day)	---	1.0(j)	---	---
Skin Surface Area Available for Contact (cm^2)	---	12,800(k)	---	---
Exposure Frequency (days/year)	---	70(h2)	---	---

TABLE 5-3

	Construction Worker	Child Resident/ Trespasser	Employee	Nearby Resident
Groundwater				
Ingestion Rate (l/day)	---	---	---	2(b1)
Exposure Frequency (days/year)	---	---	---	350(b1)
Exposure Time (hrs/shower)	---	---	---	0.2 (l)
Skin Surface Area Available for Contact (cm^2)	---	---	---	23,000(m)
Air				
Air Inhalation Rate	1.3 m^3/hr(n)	--	1.3 m^3/hr(n)	13.25 m^3/day(q)
Dust Concentration	1.0 mg/m^3(o)	--	0.008/1.0 mg/m^3(o)	Not applicable
Fraction of dust from contaminated area	1.0(g1)	--	0.25/1.0(g1)	Not applicable
Exposure frequency	45(h1)	--	250(b1)	350(b1)
Exposure Time (hrs/day)	8(p)	--	8(p)	Not applicable

Footnotes:

a. 50th percentile time weighted average body weight for older children ages 6 to 16 years old (U.S. EPA, 1989)

b1. RAGS supplemental guidance (U.S. EPA, 1991).

b2. 50th percentile time weighted average body weight from birth to 30 years old (i.e., 6 of 30 years at 15 kg + 24 of 30 years at 70 kg (U.S. EPA, 1991)).

b3. Time weighted soil ingestion rate for person from birth to 30 years old (U.S. EPA 1991).

c1. It was assumed, for risk assessment purposes, that a construction worker may be working on a particular construction project for one year (IEPA 1996).

c2. Assumes children and teenagers from ages 7 to 16 play on site.

d. Based on the national upperbound time at one residence (U.S. EPA 1991b, 1989a).

e1. Responsible worst case skin surface area for soil contact obtained from Dermal Exposure Assessment Principles and Applications (U.S. EPA, 1992).

e2. 50th percentile surface area for children's hands, arms, feet, legs, neck and head (U.S. EPA, 1992 and 1989); time weighted value for ages 7 to 16 years old.

TABLE 5-3

f. Reasonable worst case soil to skin adherence factor (U.S. EPA, 1992).

g1. The fraction ingested/contacted/inhaled value was conservatively assumed to be 1 for all receptors except a current worker; that is the receptor consumes or contacts 100% of soil or sediment within chemically impacted areas on site. For a current worker, it was assumed that only 25 percent was from a contaminated area based on contamination being under buildings, pavement, or in heavily vegetated areas where workers have little opportunity for contact.

h1. Represents a default exposure factor for construction workers provided in *Tiered Approach to Clean-up Objectives* (IEPA, 1996).

h2. Assumes the frequency with which an individual will visit the site or adjacent Rock River is influenced by climatic conditions, e.g., air temperatures. Value assumes individuals will visit adjacent surface water bodies 4 days/week during the 4 months (June-Sept) when the average daily maximum air temperatures are above 70°F (NOAA 1989).

i. Value provided for swimming (U.S. EPA, 1989).

j. Reasonable worst-case estimate of length of swimming per event (U.S. EPA 1992).

k. 50th percentile total surface area for children (U.S. EPA 1992); time weighted value for ages 7 to 16 years old.

l. Refer to Appendix G.

m. Reasonable worst case skin surface area available for water contact while bathing (U.S. EPA 1992).

n. Recommended hourly average inhalation rate for outdoor workers (U.S. EPA 1997).

o. See Section 5.4.6.

p. Assumed based on professional judgment the average work day would be 8 hrs.

q. The average of the recommended inhalation rate for adult males and females (i.e., 15.2 + 11.3)/2 = 13.25) cited in U.S. EPA (1997).

TABLE 5-4
Matrix of Potentially Complete Expsoure Pathways
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Groundwater - Central Beloit	Groundwater	Tap Water	Beloit Corporation Employees	Ingestion	On-Site	Qualitative	The facility obtains water from the deeper aquifer, rather than the shallow aquifer that has been impacted by solvents. However, a qualitative analysis of potential risks assuming use of the shallow aquifer has been performed for informational purposes.
				Residents (Children and Adults)	Ingestion Dermal	On-Site	None	There are no current residents on the facility property.
		Air	Shower	Residents (Children and Adults)	Inhalation	On-Site	None	There are no current residents on the facility property.
			House (indoor air)	Residents (Children and Adults)	Inhalation	On-Site	None	There are no current residents on the facility property.
			Beloit Corporation buildings (indoor air)	Beloit Corporation Employees	Inhalation	On-Site	None	Depth to groundwater (approximately 25 ft bgs) makes any vapors too deep to be effectively drawn upwards into a building.
	Groundwater - Southern Wells South of Beloit Corporation (Village of Rockton)	Groundwater	Tap Water	Residents (Children and Adults)	Ingestion Dermal	Off-Site	None	The one impacted private supply well has been removed and the residence has been hooked up to the municipal supply. Groundwater flow is away from Village Well No. 5 (the municipal well), and this well is not affected by site contamination.
		Air	Shower	Residents (Children and Adults)	Inhalation	Off-Site	None	The one impacted private supply well has been removed and the residence has been hooked up to the municipal supply. Groundwater flow is away from Village Well No. 5 (the municipal well), and this well is not affected by site contamination.
			House (indoor air)	Residents (Children and Adults)	Inhalation	Off-Site	None	Depth to groundwater (approximately 25 ft bgs) makes any vapors too deep to be effectively drawn upwards into a building.
	Groundwater - Southern Blackhawk Acres Subdivision Wells	Groundwater	Tap Water	Residents (Children and Adults)	Ingestion Dermal	Off-Site	Quantitative	Evaluates residents with concentrations below MCLs. Residents whose private wells have been affected above MCLs have been placed on point-of-entry treatment systems.
		Air	Shower	Residents (Children and Adults)	Inhalation	Off-Site	Quantitative	Evaluates residents with concentrations below MCLs. Residents whose private wells have been affected above MCLs have been placed on point-of-entry treatment systems.
			House (indoor air)	Residents (Children and Adults)	Inhalation	Off-Site	None	Depth to groundwater (approximately 25 ft bgs) makes any vapors too deep to be effectively drawn upwards into a building.
	Groundwater - Northern Blackhawk Acres Subdivision Wells	Groundwater	Tap Water	Residents (Children and Adults)	Ingestion Dermal	Off-Site	Quantitative	Residents use groundwater containing chloroform, and do not have point-of-entry treatment systems.
		Air	Shower	Residents (Children and Adults)	Inhalation	Off-Site	Quantitative	Residents use groundwater containing chloroform, and do not have point-of-entry treatment systems.
			House (indoor air)	Residents (Children and Adults)	Inhalation	Off-Site	None	Depth to groundwater (approximately 25 ft bgs) makes any vapors too deep to be effectively drawn upwards into a building.
	Groundwater - Eastern Blackhawk Acres Subdivision Wells	Groundwater	Tap Water	Residents (Children and Adults)	Ingestion Dermal	Off-Site	Quantitative	Evaluates residents with concentrations below MCLs. Residents whose private wells have been affected above MCLs have been placed on point-of-entry treatment systems.
		Air	Shower	Residents (Children and Adults)	Inhalation	Off-Site	Quantitative	Evaluates residents with concentrations below MCLs. Residents whose private wells have been affected above MCLs have been placed on point-of-entry treatment systems.
			House (indoor air)	Residents (Children and Adults)	Inhalation	Off-Site	None	Depth to groundwater (approximately 25 ft bgs) makes any vapors too deep to be effectively drawn upwards into a building.

TABLE 5-4
Matrix of Potentially Complete Expsoure Pathways
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Soil	Soil	Soil on Beloit Corporation Property	Beloit Corporation Employees	Ingestion Dermal	On-Site	Quantitative	Employees could have exposure to soils that are accessible (i.e., in their work area where soil is not covered by pavement, buildings, or dense vegetation). Also evaluated, for informational purposes, exposure to soils that are currently inaccessible, but that could be made accessible by construction work
				Construction Workers	Ingestion Dermal	On-Site	Quantitative	Construction workers could have dermal contact and incidental ingestion with soil constituents to a depth of 10 feet below ground surface. Soil at all depths evaluated for informational purposes
				Trespassers	Ingestion Dermal	On-Site	Quantitative	Trespassers could have dermal contact and incidental ingestion with soil outside of the actual plant facility.
		Deer	Consumption of Game	Hunters	Ingestion	On-Site	None	Constituent concentrations in game expected to be low. Area of impacted soil much less than the home range of primary game species (deer). PCB concentrations in soil are low (less than 1 ppm), indicating that concentrations in plants would also be low. Metals present in elevated concentrations are inefficiently transferred to plants.
		Air	Dust/Air on Beloit Corporation Property	Beloit Corporation Employees	Inhalation	On-Site	Quantitative	Inhalation of contaminated dust evaluated for all worker scenarios. Inhalation of VOCs not quantified. VOC concentrations in soil and soil gas are low. A high volume of air is circulated throughout the plant, and there is a thick concrete slab between soil and the plant so that even these low VOC concentrations are unlikely to impact air inside the facility.
				Construction Workers	Inhalation	On-Site	Quantitative	Construction workers could inhale dust containing site constituents during construction activities to a depth of ten feet below ground surface. Soil at all depths evaluated for information purposes. Inhalation of vapors considered to be less significant since VOC concentrations are less than 1 mg/kg.
				Trespassers	Inhalation	On-Site	None	Impacts from dust not quantified because soil containing constituents is covered by asphalt, buildings, or vegetation. VOC concentrations in soil are low (less than 1 mg/kg)
		Soil	Soil on areas adjacent of Blackhawk Corporation property	Residents (Children and Adults)	Ingestion Dermal	Off-Site	None	Chemically-impacted soils limited to industrial property.
		Homegrown Produce	Produce on areas adjacent to Blackhawk Corporation Property	Residents (Children and Adults)	Ingestion	Off-Site	None	Minimal off-site dust transport indicates that produce will not accumulate site constituents. Dust transport low due to the fact that soil impacted by constituents is covered by asphalt, buildings, or vegetation.
		Air	Dust/air on areas adjacent to Blackhawk Corporation Property	Residents (Children and Adults)	Inhalation	Off-Site	None	Minimal off-site dust transport due to the fact that soil impacted by constituents is covered by asphalt, buildings, or vegetation
	Surface Water/ Sediment	Surface Water	Rock River	Residents (Children/ Teenagers)	Ingestion Dermal	Off-Site	Quantitative	Children/teenagers playing in the Rock River may have incidental ingestion and dermal contact with constituents in the river where groundwater discharges to the river. VOCs associated with site activities have not been detected by the NPL Site
		Air	Air above Rock River	Residents (Children/ Teenagers)	Inhalation	Off-Site	None	VOCs have not been detected in the Rock River
		Sediment	Rock River	Residents (Children/ Teenagers)	Ingestion Dermal	Off-Site	Quantitative	Children/teenagers playing in the Rock River by the NPL Site may have incidental ingestion and dermal contact with constituents in the river sediments. This analysis is performed for informational purposes, as constituents in sediment are not known to be site-related. Minimal concentrations anticipated in Rock River sediment south of the site.
		Fish	Rock River	Residents	Ingestion	Off-Site	None	Chemicals detected in sediments (PAHs and select metals) are not effectively bioconcentrated in fish tissue, and there is limited access to the river along the reach adjacent to the Beloit Corporation property. The property is posted with no trespassing signs, and there are no public boat launches in the area

TABLE 5-4
Matrix of Potentially Complete Expsoure Pathways
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Hypothetical Future	Groundwater - Central Beloit	Groundwater	Tap Water	Beloit Corporation Employees	Ingestion	On-Site	Qualitative	Future scenario same as under current land use conditions
				Residents (Children and Adults)	Ingestion Dermal	On-Site	Quantitative	Scenario evaluated under hypothetical circumstance that facility property were to become residential
		Air	Shower	Residents (Children and Adults)	Inhalation	On-Site	Quantitative	Scenario evaluated under hypothetical circumstance that facility property were to become residential
			House (indoor air)	Residents (Children and Adults)	Inhalation	On-Site	None	Depth to groundwater (approximately 25 ft bgs) makes any vapors too deep to be effectively drawn upwards into a building.
			Beloit Corporation buildings (indoor air)	Beloit Corporation Employees	Inhalation	On-Site	None	Future scenario same as under current land use conditions
	Groundwater - Southern Wells South of Beloit Corporation (Village of Rockton)	Groundwater	Tap Water	Residents (Children and Adults)	Ingestion Dermal	Off-Site	Quantitative	Scenario evaluated under hypothetical circumstance that private wells become affected by existing contamination
		Air	Shower	Residents (Children and Adults)	Inhalation	Off-Site	Quantitative	Scenario evaluated under hypothetical circumstance that private wells become affected by existing contamination
			House (indoor air)	Residents (Children and Adults)	Inhalation	Off-Site	None	Future scenario same as under current land use conditions
	Groundwater - Southern Blackhawk Acres Subdivision Wells	Groundwater	Tap Water	Residents (Children and Adults)	Ingestion Dermal	Off-Site	Quantitative	Scenario evaluated under hypothetical circumstance that point of use treatment system had not been installed.
		Air	Shower	Residents (Children and Adults)	Inhalation	Off-Site	Quantitative	Scenario evaluated under hypothetical circumstance that point of use treatment system had not been installed
			House (indoor air)	Residents (Children and Adults)	Inhalation	Off-Site	None	Future scenario same as under current land use conditions.
	Groundwater - Northern Blackhawk Acres Subdivision Wells	Groundwater	Tap Water	Residents (Children and Adults)	Ingestion Dermal	Off-Site	Quantitative	Future scenario same as under current land use conditions
		Air	Shower	Residents (Children and Adults)	Inhalation	Off-Site	Quantitative	Future scenario same as under current land use conditions
			House (indoor air)	Residents (Children and Adults)	Inhalation	Off-Site	None	Future scenario same as under current land use conditions
	Groundwater - Eastern Blackhawk Acres Subdivision Wells	Groundwater	Tap Water	Residents (Children and Adults)	Ingestion Dermal	Off-Site	Quantitative	Scenario evaluated under hypothetical circumstance that point of use treatment system had not been installed.
		Air	Shower	Residents (Children and Adults)	Inhalation	Off-Site	Quantitative	Scenario evaluated under hypothetical circumstance that point of use treatment system had not been installed
			House (indoor air)	Residents (Children and Adults)	Inhalation	Off-Site	None	Future scenario same as under current land use conditions.

TABLE 5-4
Matrix of Potentially Complete Expsoure Pathways
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Exposure Route	On-Site/ Off-Site	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Hypothetical Future	Soil	Soil	Soil on Beloit Corporation Property	Potential Future Site Employees	Ingestion Dermal	On-Site	Quantitative	Employees could have increased exposure frequency. For informational purposes, also evaluated scenario whereby employees work adjacent to construction work and are exposed to dust from construction projects
				Construction Workers	Ingestion Dermal	On-Site	Quantitative	Future scenario same as under current land use conditions
				Trespassers	Ingestion Dermal	On-Site	Quantitative	Future scenario same as under current land use conditions
		Deer	Consumption of Game	Hunters	Ingestion	On-Site	None	Future scenario same as under current land use conditions
		Air	Dust/Air on Beloit Corporation Property	Beloit Corporation Employees	Inhalation	On-Site	None	Future scenario same as under current land use conditions
				Construction Workers	Inhalation	On-Site	Quantitative	Future scenario same as under current land use conditions
				Trespassers	Inhalation	On-Site	None	Future scenario same as under current land use conditions
		Soil	Soil on areas adjacent of Blackhawk Corporation property	Residents (Children and Adults)	Ingestion Dermal	Off-Site	None	Future scenario same as under current land use conditions
		Homegrown Produce	Produce on areas adjacent to Blackhawk Corporation Property	Residents (Children and Adults)	Ingestion	Off-Site	None	Future scenario same as under current land use conditions.
		Air	Dust/air on areas adjacent to Blackhawk Corporation Property	Residents (Children and Adults)	Inhalation	Off-Site	None	Future scenario same as under current land use conditions
	Surface Water/ Sediment	Surface Water	Rock River	Residents (Children/ Teenagers)	Ingestion Dermal	Off-Site	Quantitative	Future scenario same as under current land use conditions
		Air	Air above Rock River	Residents (Children/ Teenagers)	Inhalation	Off-Site	None	Future scenario same as under current land use conditions
		Sediment	Rock River	Residents (Children/ Teenagers)	Ingestion Dermal	Off-Site	Quantitative	Future scenario same as under current land use conditions
		Fish	Rock River	Residents (Children and Adults)	Ingestion	Off-Site	None	Future scenario same as under current land use conditions

Table 6-1

Summary Of Health Risk Estimates Under Current Site Conditions
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Table Index	Receptor	Medium	Exposure Point	Hazard Index By Route				Cancer Risks By Route			
				Dermal	Ingestion	Inhalation	Total	Dermal	Ingestion	Inhalation	Total
Exposed Population: Nearby Residents											
Table D-4	Northern Blackhawk Acres Residents (1)	Groundwater	Tap	4.0E-04	3.9E-02	1.3E-01	2E-01	1.0E-08	1.0E-06	4.5E-05	5E-05
Table D-5	Other Blackhawk Acres Residents (2)	Groundwater	Tap	1.4E-03	4.2E-02	3.2E-02	8E-02	2.1E-07	4.1E-06	2.4E-06	7E-06
Table D-6	Rock River Recreational User	Surface water, modeled	Rock River South of Village of Rockton	1.8E-06	3.8E-07	0.0E+00	2E-06	1.3E-10	2.9E-11	0.0E+00	2E-10
Table D-7	Rock River Recreational Users	Sediment	Rock River Adjacent to Beloit Corporation Property	1.2E-01	3.4E-02	0.0E+00	2E-01	6.7E-07	1.1E-06	0.0E+00	2E-06
Table D-8	Tresspasser	Soil	On-Beloit Corporation Property Surface Soil	2.5E-01	6.4E-02	0.0E+00	3E-01	1.2E-06	1.3E-06	0.0E+00	3E-06
Total Risks											
Tables D-3,6,7,8	Northern Blackhawk Acres Residents	All Media	Multiple	3.8E-01	1.4E-01	1.3E-01	6E-01	1.9E-06	3.4E-06	4.5E-05	5E-05
Tables D-4,6,7,8	Other Blackhawk Acres Residents (2)	All Media	Multiple	3.8E-01	1.4E-01	3.2E-02	6E-01	2.1E-06	6.5E-06	2.4E-06	1E-05
Exposed Population: On-Site Employees											
Table D-9	Employees	Soil	On-Beloit Corporation Property Surface Soil	3.4E-01	2.0E-02	1.5E-02	4E-01	1.2E-06	8.4E-07	2.5E-07	2E-06
Table D-10	Future Employees	Soil	On-Beloit Corporation Property Surface Soil	1.3E+00	8.0E-02	1.5E-02	1E+00	5.0E-06	3.3E-06	2.5E-07	9E-06
Exposed Population: Construction Workers											
Table D-11	Construction Worker	Soil	On-Beloit Corporation Property Excavation	8.6E-02	9.0E-02	6.9E-02	2E-01	1.5E-07	2.3E-07	3.1E-08	4E-07

Note:
This table summarizes the health risks by exposed population and medium. Refer to the risk tables indexed to review the chemical-specific risk estimates. It should be noted that a Hazard Index (HI) less than one indicates no noncarcinogenic health effects are expected in the exposed population. In addition, a cumulative excess cancer risk (CR) below 1x10-4 is within the health protective risk range of 1x10-6 to 1x10-4

Footnotes:

1. These represent the potential risks for the residences in the Northern Blackhawk Acres Subdivision that do not have point-of-use groundwater treatment systems, and use groundwater containing chloroform below Federal Drinking Water standards. It was assumed for purposes of this scenario that a resident consumed on a daily basis all of their drinking water from their private well in the Northern Blackhawk Subdivision area for thirty (30) years, and the concentration of chloroform in the groundwater was assumed to be equivalent to the average concentration in the private well where the maximum concentration of chloroform was detected.
2. These represent the potential risks for the other residences throughout the Blackhawk Acres Subdivision that do not have point-of-use groundwater treatment systems, but use groundwater containing concentrations of chemicals below Federal Drinking Water Standards. It was assumed for purposes of this scenario that a resident consumed on a daily basis all of their drinking water from their private well in the Blackhawk Subdivision for thirty (30) years, and the concentration of the chemical in the groundwater was assumed to be equivalent to the maximum concentration detected in any of the other private wells not having a point of use treatment. Note that the chloroform affected wells in the Northern area have been handled separately (refer to Table D-4).

TABLE 7-1

Comparison of Analytes Detected in Sediments to Toxicity Benchmarks
Baseline Risk Assessment
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Parameter		SD01	SD02	SD03	SD04	SD04 Dup	SD05	SD06	SD07	SD08	SD09	SD10	Toxicity Benchmark
VOLATILES													
2-Butanone	ug/kg				11		4		36				n/a
Acetone	ug/kg				69		20	22	160		18		n/a
Ethylbenzene	ug/kg								150				n/a
Xylenes (total)	ug/kg								110				n/a
SEMIVOLATILES													
Di-n-butylphthalate	ug/kg							310					n/a
2-Methylnaphthalene	ug/kg								48000				See Total PAHs
4-Methylphenol	ug/kg										110		See Total PAHs
Acenaphthene	ug/kg								40000				See Total PAHs
Acenaphthylene	ug/kg								7600		140		See Total PAHs
Anthracene	ug/kg								42000		230		See Total PAHs
Benzo(a)anthracene	ug/kg		60						38000		500		See Total PAHs
Benzo(a)pyrene	ug/kg		75						30000		460		See Total PAHs
Benzo(b)fluoranthene	ug/kg								20000		230		See Total PAHs
Benzo(g,h,i)perylene	ug/kg		41						12000		190		See Total PAHs
Benzo(k)fluoranthene	ug/kg								17000		360		See Total PAHs
Chrysene	ug/kg		60						35000		490		See Total PAHs
Dibenz(a,h)anthracene	ug/kg								5600		86		See Total PAHs
Dibenzofuran	ug/kg								7400				See Total PAHs
Fluoranthene	ug/kg		52	54					64000		840	55	See Total PAHs
Fluorene	ug/kg								27000		46		See Total PAHs
Indeno(1,2,3-cd)pyrene	ug/kg								10000		180		See Total PAHs
Naphthalene	ug/kg								24000				See Total PAHs
Phenanthrene	ug/kg								100000		280		See Total PAHs
Pyrene	ug/kg		83	70					84000		1100	89	See Total PAHs
TOTAL PAHs	ug/kg		371	124					**611600**		**5242**	144	**4000**
METALS													
Aluminum	mg/kg	2130	3170	4550	5710	5560	9480	10600	7570	1150	3850	1880	58030 (b)
Arsenic	mg/kg	0.73	1.5	1.1	1.4	1.1	1.6	1.7	**7.3**	0.76	2.1	0.48	**6**
Barium	mg/kg	8.4	11.9	81.8	54.9	52.8	166	107	135	6.9	25	8.7	n/a
Cadmium	mg/kg			**1.6**	**1.3**	**2.2**	**3**	**3.9**	**2.5**		**1.2**		**0.6**
Calcium	mg/kg	83600	68000	75700	1900	1760	5350	4630	72000	14000	34000	39000	n/a
Chromium, total	mg/kg	4.3	5.3	7.8	7.9	7.3	14.5	17.5	13.9		7.2	3.6	26
Cobalt	mg/kg	2.9	4.1	4.6	4.6	3.9	8.6	7.2	6.4		3.7		n/a

TABLE 7-1

Comparison of Analytes Detected in Sediments to Toxicity Benchmarks
Baseline Risk Assessment
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Parameter		SD01	SD02	SD03	SD04	SD04 Dup	SD05	SD06	SD07	SD08	SD09	SD10	Toxicity Benchmark
Copper	mg/kg	3.4	7.8	3.8	6.6	5.9	13.9	8.2	**40.6**		7		16
Iron	mg/kg	4320	6110	8890	10900	11000	13600	20000	12600	3430	7140	3520	20000
Lead	mg/kg	2.8	3.5	4.6	5	4.1	11.5	8	**94**	1.6	8.8	3.5	**31**
Magnesium	mg/kg	43400	30600	15100	2050	1930	2690	3780	13900	7950	19000	19200	n/a
Manganese	mg/kg	199	157	414	128	123	**728**	**594**	392	53.5	153	88.3	**460**
Mercury	mg/kg	0.05	0.05	0.06	0.05	0.06	0.06		**4.1**	0.05		0.07	**0.2**
Nickel	mg/kg		5.5	8.1	11.2	8.6	12.2	12.8	**18.8**		7.2		**16**
Potassium	mg/kg	439	533	441	439	428	658	722	841	150	399	243	n/a
Selenium	mg/kg						0.54		0.85				n/a
Thallium	mg/kg		0.15	0.16	0.18	0.18	0.25	0.24	0.44		0.15		n/a
Vanadium	mg/kg				14.8	14.9	16.6	22.1			13.9		n/a
Zinc	mg/kg	12.7	20.6	29.6	32.4	31	80.9	48	**156**	7.6	23.9	13.6	**120**
Total Organic Carbon	mg/kg	15000	5500	9700	5100		> 16000	9600	>16000	2100	>16000	4700	n/a
pH	mg/kg	7.4	7.45	7.48	7.32		6.73	7.08	6.96	7.24	7.69	7.69	n/a
Total Solids	mg/kg	87.1	87.4	73.6	77.4	79.8	66.7	75.8	39.8	73.9	83.3	82.1	n/a

Notes:

This table presents a summary of analytes detected in sediment samples collected during Phase III of the Beloit Corporation - Blackhawk Facility RI.
Only those parameters detected in at least one sample are included.
Results are presented on a dry weight basis.
Bolded values indicate concentrations which exceed the Toxicity Benchmark (TB), or Toxicity Benchmarks which were exceedec

Footnotes:

(a) Toxicity Benchmarks are Ontario Ministry of the Environment "Low" (OME-Low) effect concentrations, unless otherwise noted. The toxicity benchmarks were found in "Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Sediment-Associated Biota: 1997 Revision," prepared for the U.S. Department of Energy
(b) Value represents Assessment and Remediation of Contaminated Sediments Program (ARCS) probable effect concentration (PEC) presented in Table 4 of Benchmark document.

Legend:

(1) "n/a" indicates Toxicity Benchmark concentration is not available or established

TABLE 7-2

Summary of Volatile Organic Compounds Detected in Terrestrial Habitats
Baseline Risk Assessment
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Sample ID	Toluene	Acetone
Background		
BC-SUSG107-00		40
Foundry Sand Disposal Area		
BC-SUSB12-00		
BC-SUSB13-00		89
BC-SSSSS02-01	2	
BC-SSSSS03-01	6	
BC-SSSSS04-01		
BC-SSSSS04-01D		
BC-SSSSS05-01		
BC-SSSSS06-01		
Fiberous Sludge Spreading Area		
BC-SSSSS07-01		
BC-SSSSS07-01D		
BC-SSSSS08-01		
BC-SSSSS09-01		
BC-SSSSS10-01		
BC-SSSSS11-01		
BC-SUSB10-00		
BC-SUSB11-00		
BC-SUSB11-90		
Gravel Pit		
BC-SUSB19-00		
BC-SUW24-00		
Plant Toxicity Benchmark	200,000	n/a
Soil Invertebrate Toxicity Benchmark	n/a	n/a
Soil Preliminary Remediation Goal	200,000	n/a

Notes:

1. This table presents a summary of TCL volatile detections in surface soil samples collected during Phase I and II of the Beloit Corporation - Blackhawk Facility RI.
2. Only those compounds which were detected in at least one sample are included here.
3. Results are presented in units of ug/kg on a dry weight basis.
4. A blank indicates the compound was not detected in that sample.
5. Background surface soil samples SS12, SS13, SS14, SS15, and SS16 were not analyzed for TCL parameters.
6. Plant toxicity benchmarks (TB) were obtained from ORNL document ES/ER/TM-85/R3 "Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants:1997 Revision."
7. Soil Invertebrate toxicity benchmarks were obtained from ORNL document ES/ER/TM-126/R2 "Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision."
8. Soil Invertebrate toxicity benchmarks were obtained from ORNL document ES/ER/TM-162/R2 "Preliminary Remediation Goals for Ecological Endpoints."

TABLE 7-3

Summary of Semivolatile Organic Compounds Detected in Terrestrial Habitats
Baseline Risk Assessment
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Sample ID	4-Nitrophenol	Acenaphthene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	bis(2-ethylhexyl)phthalate	Butylbenzylphthalate	Carbazole	Chrysene	Di-n-butylphthalate	Di-n-octyl Phthalate	Dibenzofuran	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	Total PAHs
Abandoned Waste Water Treatment Pond																						
BC-SUSB18-00									58													
Gravel Pit																						
BC-SUSB19-00																						
BC-SUW24-00									52													
Foundry Sand Disposal Area																						
BC-SUSB12-00									43													
BC-SUSB13-00				88	97	240	170	70	53			68					130		150	58	120	1191
BC-SSSSS02-01		230	460	1,000	1,000		340	1,400			160	1,400			93		2,400	190	570	1,600	1,800	12,685
BC-SSSSS03-01			69	580	840	900	770	840				940					960		700	310	760	7,669
BC-SSSSS04-01				38	46	47		52				65					83				67	398
BC-SSSSS04-01D												41					45				40	126
BC-SSSSS05-01				150	240	350	170	240				240					220		180	60	190	2,040
BC-SSSSS06-01		170	270	670	610	630	280	310			190	970			60		1,900	150	320	1,200	1,300	9,040
Fiberous Sludge Spreading Area																						
BC-SSSSS07-01																						
BC-SSSSS07-01D																						
BC-SSSSS08-01																						
BC-SSSSS09-01																						
BC-SSSSS10-01																						
BC-SSSSS11-01																						
BC-SUSB10-00									50					74								
BC-SUSB11-00	100								68													
BC-SUSB11-90 (Dup)									69													
Background																						
BC-SUSG107-00	100								200													
BC-SUSB30-00									52													
Plant TB	n/a	20,000	n/a	n/a	n/a	n/a	n/a	n/a	200,000	200,000	n/a	n/a	200,000	200,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	20,000
Soil Invertebrate TB	7,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	200,000	200,000	n/a	n/a	200,000	200,000	n/a	n/a	n/a	30,000	n/a	n/a	n/a	30,000
Soil PRG	7,000	20,000	n/a	n/a	n/a	n/a	n/a	n/a	200,000	200,000	n/a	n/a	200,000	200,000	n/a	n/a	n/a	n/a	n/a	n/a	n/a	20,000

TABLE 7-3

Summary of Semivolatile Organic Compounds Detected in Terrestrial Habitats
Baseline Risk Assessment
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Notes:

1. This table presents a summary of TCL semivolatile detections in surface soil samples collected during Phases I and II of the Beloit Corporation - Blackhawk Facility RI.
2. Only those compounds which were detected in at least one surface or subsurface sample are included here.
3. Results are presented in units of ug/kg on a dry weight basis.
4. A blank indicates the compound was not detected in that sample.
5. Background surface soil samples SS12, SS13, SS14, SS15, and SS16 were not analyzed for TCL parameters.
6. An "n/a" indicates Toxicity Benchmark is not available or established.
7. Plant toxicity benchmarks (TB) were obtained from ORNL document ES/ER/TM-85/R3 "Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision."
8. Soil Invertebrate toxicity benchmarks were obtained from ORNL document ES/ER/TM-126/R2 "Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision."
9. Soil preliminary remediation goals (PRGs) were obtained from the ORNL document ES/ER/TM-162/R2 "Preliminary Remediation Goals for Ecological Endpoints."

Footnotes:

1. The plant toxicity screening benchmark (TB) for di-n-butyl phthalate was used to represent the toxicity of other phthalates.
2. The plant toxicity screening benchmark and soil PRG for acenaphthene was used to represent the toxicity of total PAHs, since no other benchmarks were available.
3. The soil invertebrate toxicity screening benchmark for fluorene was used to represent the toxicity of total PAHs, since no other benchmarks were available.
4. The soil invertebrate toxicity screening benchmark (TB) for dimethylphthalate was used to represent the toxicity of other phthalates.

TABLE 7-4

Summary of Pesticide/PCB Compounds Detected In Terrestrial Habitats
Baseline Risk Assessment
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Sample ID	4,4'-DDT	Arochlor-1248	Aroclor-1254	Aroclor-1260
Foundry Sand Disposal Area				
BC-SUSB12-00				
BC-SUSB13-00				25
BC-SSSSS02-01				
BC-SSSSS03-01				42
BC-SSSSS04-01				
BC-SSSSS04-01D				
BC-SSSSS05-01				
BC-SSSSS06-01				
Fiberous Sludge Spreading Area				
BC-SSSSS07-01	3.2			
BC-SSSSS07-01D	2.3			
BC-SSSSS08-01				
BC-SSSSS09-01				
BC-SSSSS10-01			100	
BC-SSSSS11-01			42	
BC-SUSB10-00				
BC-SUSB11-00				
BC-SUSB11-90 (Dup)				
Abandoned Waste Water Treatment Pond				
BC-SUSB18-00			360	
Gravel Pit				
BC-SUSB19-00		24		
BC-SUW24-00				
Background				
BC-SUSG107-00				
BC-SUSD30-00				
Plant Toxicity Benchmark	n/a	40,000	40,000	40,000
Soil Invertebrate Toxicity Benchmark	n/a	371	371	371
Soil Preliminary Remediation Goal	n/a	n/a	n/a	n/a

Notes:

1. This table presents a summary of TCL pesticides/PCBs detection in surface soil samples collected during Phases I and II of the Beloit Corporation - Blackhawk Facility RI.
2. Only those compounds which were detected in at least one surface or subsurface sample are included here. Results are presented in units of ug/kg on a dry weight basis. A blank indicates the compound was not detected in that sample.
3. Background surface soil samples SS12, SS13, SS14, SS15, and SS16 were not analyzed for TCL parameters.
4. Plant toxicity benchmarks were obtained from ORNL document ES/ER/TM-85/R3 "Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision."
5. Soil invertebrate toxicity benchmarks were obtained from ORNL document ES/ER/TM-126/R2 "Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision."
6. Preliminary remediation goals were obtained from ORNL document ES/ER/TM-162/R2 Preliminary Remediation Goals for Ecological Endpoints."

TABLE 7-5

Summary of Metals and Cyanide Detected in Terrestial Habitats
Baseline Risk Assessment
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Sample ID	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium, total	Cobalt	Copper	Cyanide	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Vanadium	Zinc
Background																							
BC-SSSSS12-01	4,700		2.1	98.6		0.82	2,220	7.3	2.7	7.5		7,790	23.1	948	510		7.4					14	40.6
BC-SSSSS13-01	3,460		1.4	47.6			1,170	4.1		4.9		4,340	19.9	584	229		2.6					7.9	23.4
BC-SSSSS14-01	4,110		3.9	74.2			2,450	5.2	2.2	6.3		4,960	19.1	1,180	270		4.1					9.7	21.4
BC-SSSSS15-01	4,790		1.6	73			1,160	6.1	2.4	5.3		6,300	18.2	866	310		4.2					12.1	24.6
BC-SSSSS16-01	8,100		2.4	93.6			1,900	10.3	4.5	8.9		11,200	16.5	1,450	500		7.4					20	34.1
BC-SUSB30-00	6,090		3.3	98.8		2	3,760	7	5.2	7.5		8,040	31	1,410	422		8.7	712	0.53			17	37.3
BC-SUSG107-00	1,190		1.2	8.5		1.2	149,000	4.2	3.1	4.4		4,140	4.8	73,500	246		7.1	306		2.5			24.4
Background Mean	4,634	4.2	2.3	71	0.2	0.7	23,094	6.3	3.0	6.4	0.4	6,681	19	11,420	355	0.05	5.9	295	0.19	0.91	214	12	29
Mean+2std dev	8,930	6.4	4.3	137	0.5	2.1	134,147	10.6	6.0	9.7	0.9	11,750	35	66,173	595	0.08	10.5	683	0.50	2.43	249	22	45
Foundry Sand Disposal Area																							
BC-SSSSS02-01	2,660	7.8	0.45	20.5	0.29		131,000	63.2	4.2	1550		9,580	12.3	82,000	292		65.9	452				8.7	130
BC-SSSSS03-01	5,610		2.1	92.6	0.4		6,130	13.9	4.5	11.7		7,970	11.9	2,980	542		12.2	578				13.8	39
BC-SSSSS04-01	5,790		2.2	73.1	0.34		10,700	7.3	4.7	7.3		8,340	9.7	6,630	410			387				15.2	32
BC-SSSSS04-01D	6,260		2.1	73.6	0.29		11,200	9.2	3.4	7.5	0.62	8,070	12.8	5,780	368			367	0.29			14.9	44
BC-SSSSS05-01	6,320	8.7	2.9	63.3	0.33		6,770	12.8	4.4	7.3	0.81	9,280	7.7	3,460	389		14.9	261				16.2	23
BC-SSSSS06-01	11,100		5.1	75.6	0.5		5,680	13.7	6.9	10.7		15,700	9.3	4,160	521		14.3	522				26.2	31
BC-SUSB12-00	5,120		3.0	61.7		2.2	2,510	7.7	5.7	5.5		7,540	8.8	1,910	365		6.4	463				16.3	29
BC-SUSB13-00	5,280		1.8	66.8		2.2	2,880	7.1	5.5	6.6		8,040	8.6	1,880	412		6.4	471	0.71			15.3	25
Fiberous Sludge Spreading Area																							
BC-SSSSS07-01	6,960		2.1	126	0.42		2,190	9.3	5.8	8.7	0.64	10,200	13.4	1,410	666			516	0.26			18.9	35
BC-SSSSS07-01D	8,050		2.6	128	0.48		2,360	10.3	5.7	9.4		10,700	12.9	1,530	655			576				19.3	38
BC-SSSSS08-01	7,450		3.5	107	0.48		2,040	10.6	5.4	9.5	0.94	11,600	14.1	1,410	628		12.4	445	0.31			21.6	34
BC-SSSSS09-01	8,300		3.8	118	0.62		2,090	12	6.4	9.3	0.71	12,300	17.8	1,440	675			548				23.0	37
BC-SSSSS10-01	4,000		1.6	41.1	0.29	0.56	22,700	6.3	3.9	12.1		6,140	6.9	13,400	231	0.16		316				12.7	28
BC-SSSSS11-01	6,780		2.6	82.2	0.46		13,700	10.6	5.8	13.6		10,200	11.1	7,920	491	0.39		446				20.2	40
BC-SUSB10-00	12,900		4.8	126		4.3	2,460	19.3	8.1	9.8		16,000	12.8	1,990	681		13.4	1030				36.5	43
BC-SUSB11-00	6,450		2.0	61.6		2.7	11,000	8.6	5.2	9.3		8,350	11.2	6,440	361	0.35	10.7	589	0.63	2.9		19.0	34
BC-SUSB11-90 (Dup)	6,540		2.0	67.2		2.7	4,320	7.3	6.2	9.1		9,380	10.6	2,600	422	0.33	8	530				19	31

TABLE 7-5

Summary of Metals and Cyanide Detected in Terrestial Habitats
Baseline Risk Assessment
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

Gravel Pit																							
BC-SUSB19-00	5,090		2.7	47.1		1.9	27,200	5.1	4.7	12.8		8,050	5.1	4,390	295	0.18	6.6	358				14.8	23
BC-SUW24-00	6,090		3.3	98.8		2.0	3,760	7	5.2	7.5		8,040	31.0	1,410	422		8.7	712	0.53			16.9	37
Abandoned Waste Water Treatment Ponds																							
BC-SUSB18-00	3,210		3.5	27		1.3	32,000	5.4	3.6	10.5		5,130	10	17,400	198	0.28	8.1	292				11	28
Plant TB	50	5	10	500	10	4	n/a	1	20	100	n/a	n/a	50	n/a	500	0.3	30	n/a	1	2	n/a	2	50
Soil Invertebrate TB	n/a	n/a	60	n/a	n/a	20	n/a	0.4	n/a	50	n/a	n/a	500	n/a	n/a	0.1	200	n/a	70	n/a	n/a	n/a	200
Soil PRG	n/a	5	10	283	10	4	n/a	0.4	20	60	n/a	n/a	40.5	n/a	n/a	0.00051	30	n/a	0.21	2	n/a	2	8.5

Notes:

1. This table presents a summary of TAL metals and cyanide detections in surface soil samples collected during Phases I and II of the Beloit Corporation - Blackhawk Facility RI.
2. Results are presented in units of mg/kg on a dry weight basis.
3. A blank indicates the compound was not detected in that sample.
4. When metals or cyanide were not detected in background samples 1/2 the detection limit was used to calculate the mean and standard deviation.
5. Bolded values attain or exceed the Mean+2SD value for background samples (in the case of the toxicity benchmarks and preliminary remediation goals, these values are highlighted when they are less thanthe Mean +2 SD value for background). Validated background data during Phase II for beryllium and potassium were qualified undetected (with elevated detection limits) due to detects found in the laboratory blanks. The unvalidated beryllium background data had an average concentration of 0.29 mg/kg (Mean+2SD = 0.58 mg/kg). The unvalidated potassium background data had an average concentration of 439 mg/kg (Mean+2SD = 712 mg/kg). Both selenium and antimony had some values qualified as unusable due to unacceptable QC. Background mean and background mean plus 2 times the standard deviation values are presented for approximate comparison purposes only.
6. Plant toxicity benchmarks (TB) were obtained from ORNL document ES/ER/TM-85/R3 "Toxicological Benchmarks for Screening Contaminants of Potential Concern for Effects on Terrestrial Plants: 1997 Revision."
7. Soil Invertebrate toxicity benchmarks were obtained from ORNL document ES/ER/TM-126/R2 "Toxicological Benchmarks for Contaminants of Potential Concern for Effects on Soil and Litter Invertebrates and Heterotrophic Process: 1997 Revision."
8. Preliminary remediation goals (PRGs) were obtained from ORNL document ES/ER/TM-162/R2 "Preliminary Remediation Goals for Ecological Receptors."

Comparison of Site-Specific Cancer Risks to the Superfund Risk Range Under Current Site Conditions

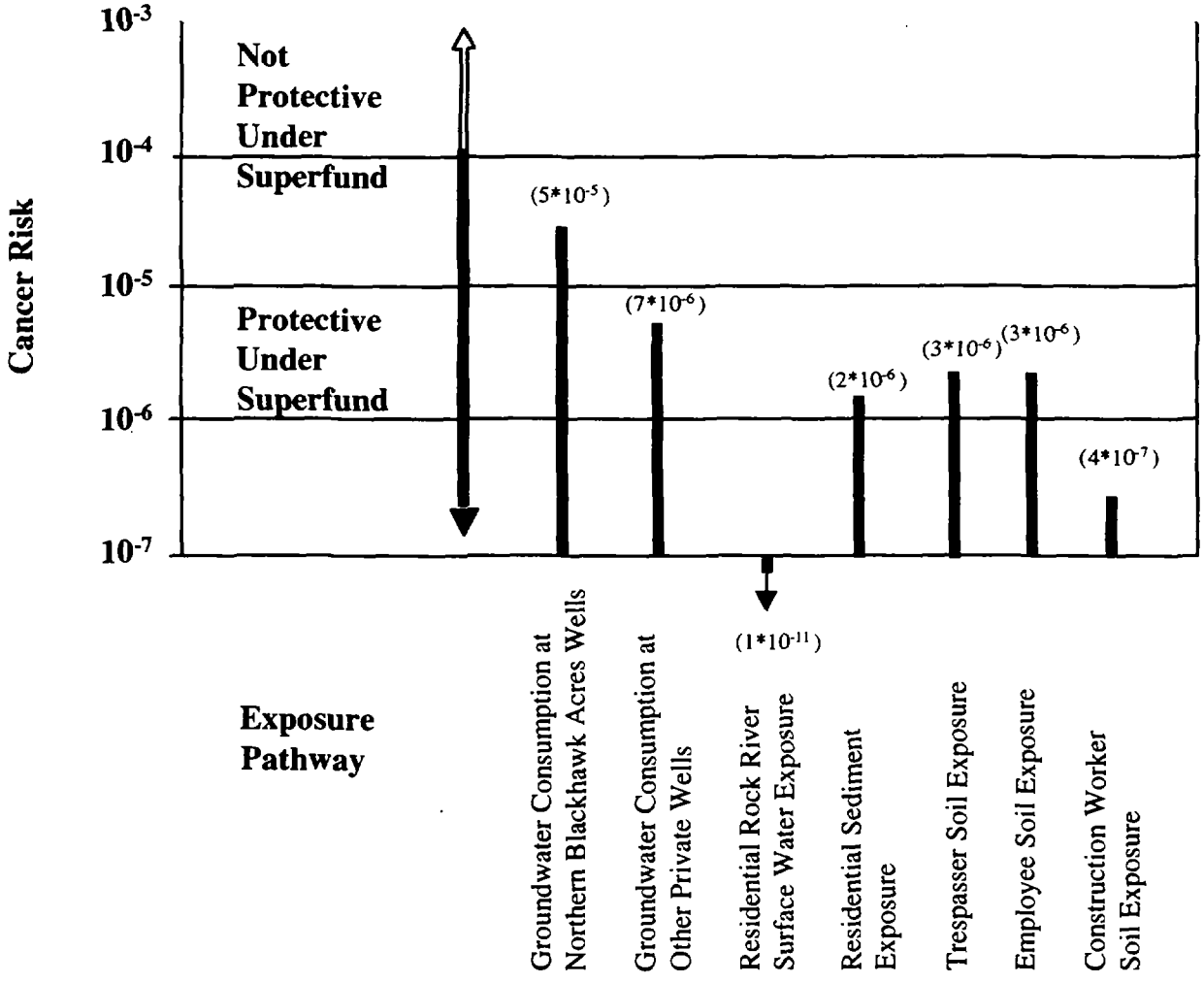


Figure 6-1

m:\jobs\1242\077\16\wp\figs 6-1 and 6-2.ppt
MLN\mln\MWK/SMS

Comparison of Site-Specific Cancer Risks to the Superfund Risk Range Under Hypothetical Future Site Conditions

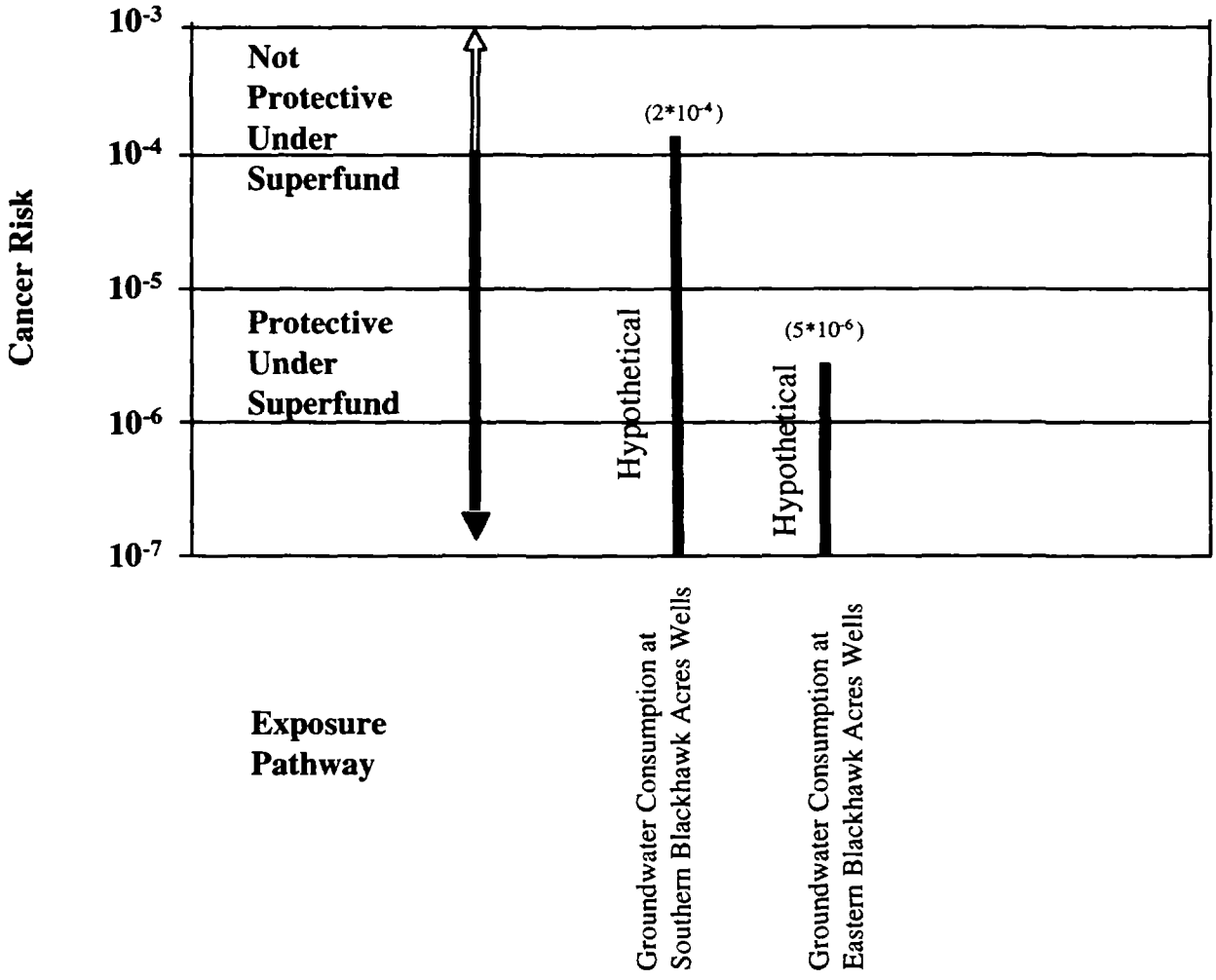


Figure 6-2

m:\jobs\1242\077\16\wp\figs 6-1 and 6-2.ppt
MLN\mln\MWK/SMS

LEGEND

APPROXIMATE RI/FS BOUNDARY

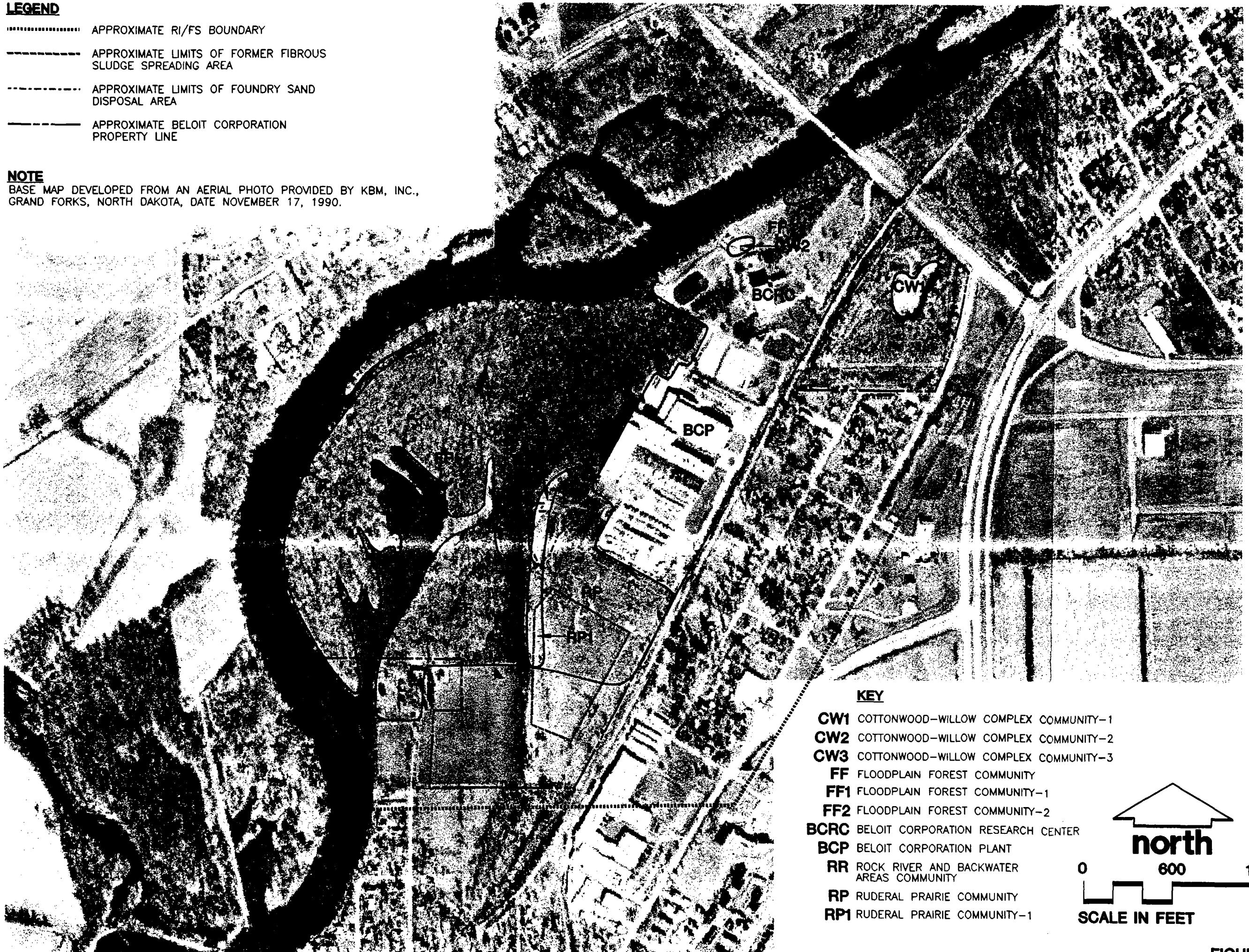
APPROXIMATE LIMITS OF FORMER FIBROUS SLUDGE SPREADING AREA

APPROXIMATE LIMITS OF FOUNDRY SAND DISPOSAL AREA

APPROXIMATE BELOIT CORPORATION PROPERTY LINE

NOTE

BASE MAP DEVELOPED FROM AN AERIAL PHOTO PROVIDED BY KBM, INC., GRAND FORKS, NORTH DAKOTA, DATE NOVEMBER 17, 1990.



KEY

CW1	COTTONWOOD–WILLOW COMPLEX COMMUNITY–1
CW2	COTTONWOOD–WILLOW COMPLEX COMMUNITY–2
CW3	COTTONWOOD–WILLOW COMPLEX COMMUNITY–3
FF	FLOODPLAIN FOREST COMMUNITY
FF1	FLOODPLAIN FOREST COMMUNITY–1
FF2	FLOODPLAIN FOREST COMMUNITY–2
BCRC	BELOIT CORPORATION RESEARCH CENTER
BCP	BELOIT CORPORATION PLANT
RR	ROCK RIVER AND BACKWATER AREAS COMMUNITY
RP	RUDERAL PRAIRIE COMMUNITY
RP1	RUDERAL PRAIRIE COMMUNITY–1

north

0 600 1200

SCALE IN FEET

FIGURE 7-1

VEGETATION COMMUNITIES

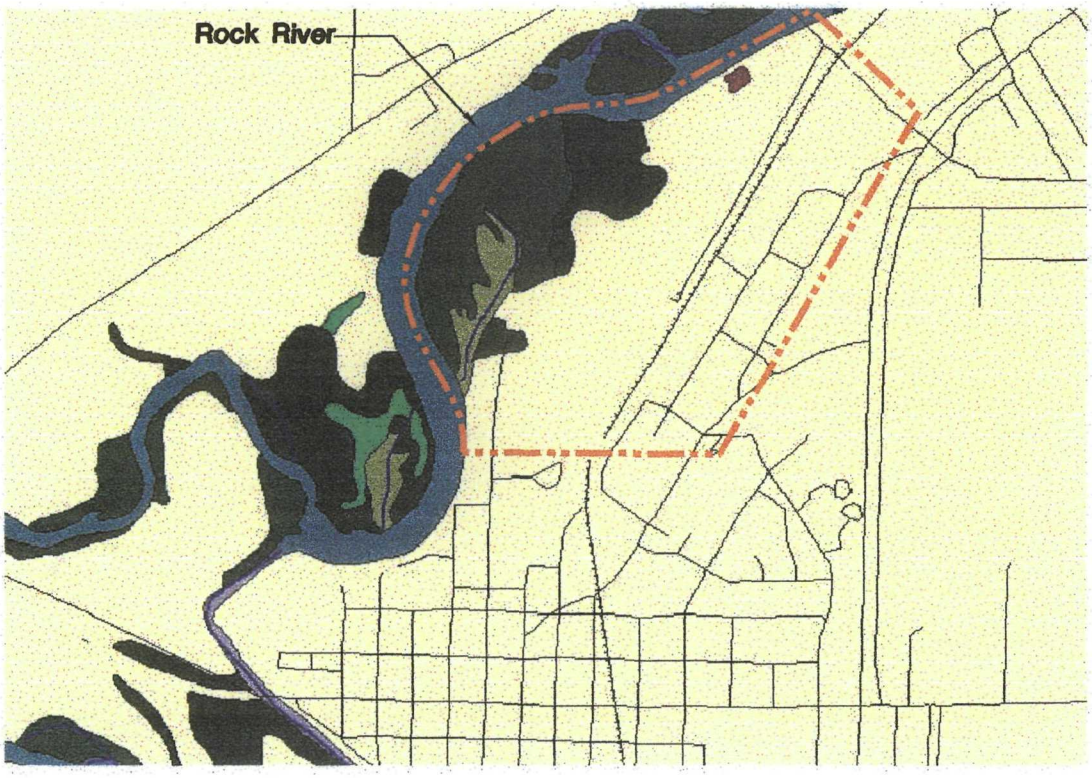
BASELINE RISK ASSESSMENT
BELOIT CORPORATION BLACKHAWK FACILITY
SECTIONS 12 AND 13, T6N, R1E
TOWN OF ROCKTON, WINNEBAGO COUNTY, ILLINOIS

Drawing Number
1242077
16180101 **B1**

MONTGOMERY WATSON

Developed By AP Drawn By DLF,LCL
Approved By [signature] Date 10-11-99
Reference
Revisions

QUALITY CONTROL
Graphic Standards DLF 10-11-99
Lead Professional
Technical Review
Project Manager MWK 10-11-99
Management Review
Other



LEGEND

ROADS
RAILROADS
STREAMS

OTHER	
PEMA	[P]Palustrine, [EM]Emergent, [A]Temporarily Flooded
PF01A	[P]Palustrine, [FO]Forested, [1]Broad-Leaved Deciduous, [A]Temporarily Flooded
PF01C	[P]Palustrine, [FO]Forested, [1]Broad-Leaved Deciduous, [A]Seasonally Flooded
PUBG	[P]Palustrine, [UB]Unconsolidated Bottom, [G]Intermittently Exposed
PUBKH	[P]Palustrine, [UB]Unconsolidated Bottom, [K]Artificially Flooded, [H]Permanently Flooded.
R2UBH	[R]Riverine. [2]Lower Perennial, [UB]Unconsolidated Bottom, [H]Permanently Flooded
R2UBHX	[R]Riverine. [2]Lower Perennial, [UB]Unconsolidated Bottom--Water regime error. Two modifiers and first one is not K.
UPLAND	[U]Upland

APPROXIMATE RI/FS BOUNDARY

NOTE

MAP DEVELOPED FROM NATIONAL WETLAND INVENTORY DIGITAL DATA, ACCESSED AT WWW.NWI.TWS.GOV ON FEBRUARY 4, 2000.

north

0 2000 4000

SCALE IN FEET

Figure 7-2

QUALITY CONTROL | Graphic Standards DL | Lead Professional MLN | Technical Review MWK | Project Manager | Management Review | Other

Developed By MLN Drawn By LCL

Approved By [signature] Date 2-28-00

Reference

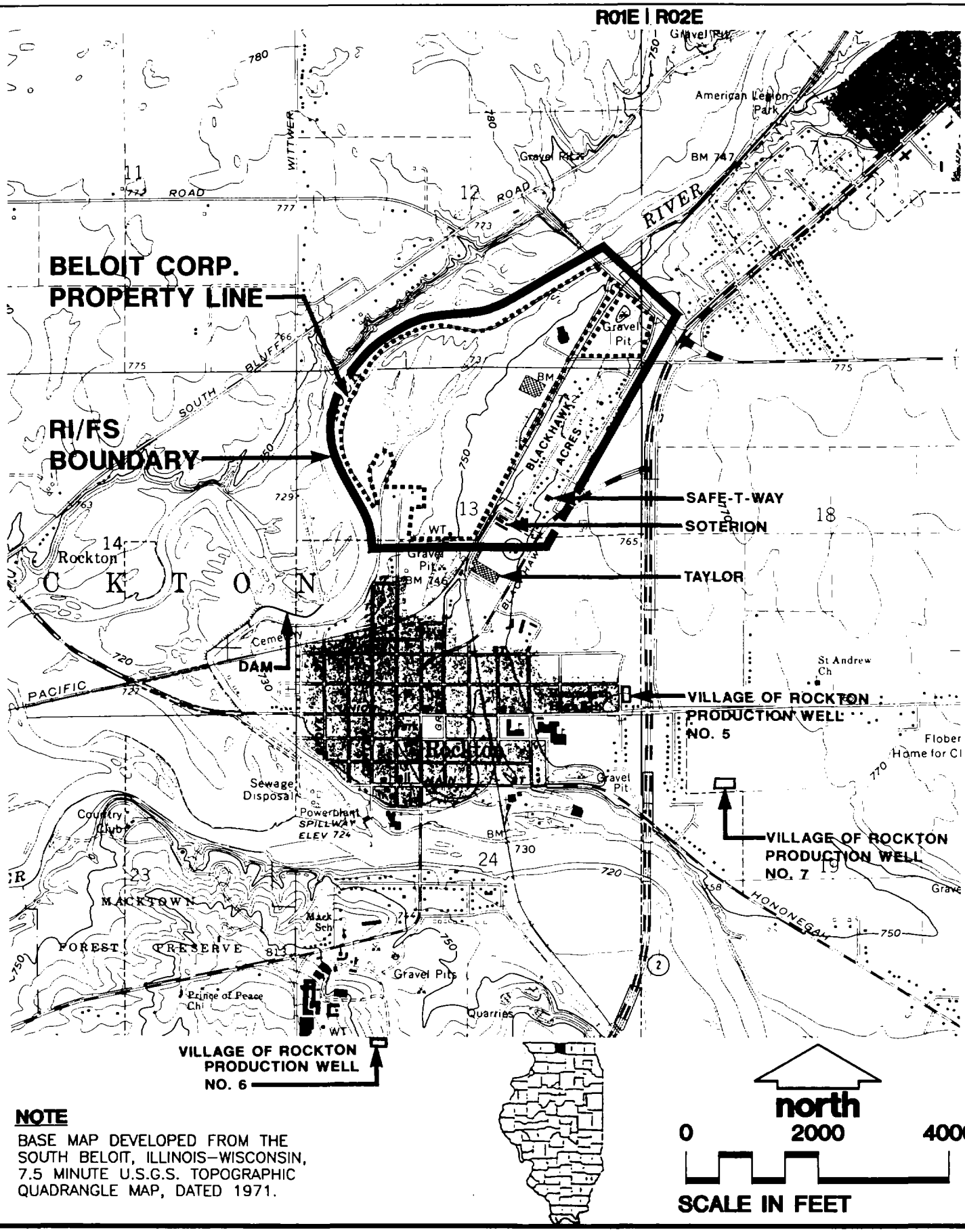
Revisions

NATIONAL WETLANDS INVENTORY MAP FOR NPL SITE AREA

BASELINE RISK ASSESSMENT
BELOIT CORPORATION BLACKHAWK FACILITY
SECTIONS 12 AND 13, T46N, R1E
TOWN OF ROCKTON, WINNEBAGO CO., ILLINOIS

Drawing Number
1242077
16180101 A4

MONTGOMERY WATSON



NOTE

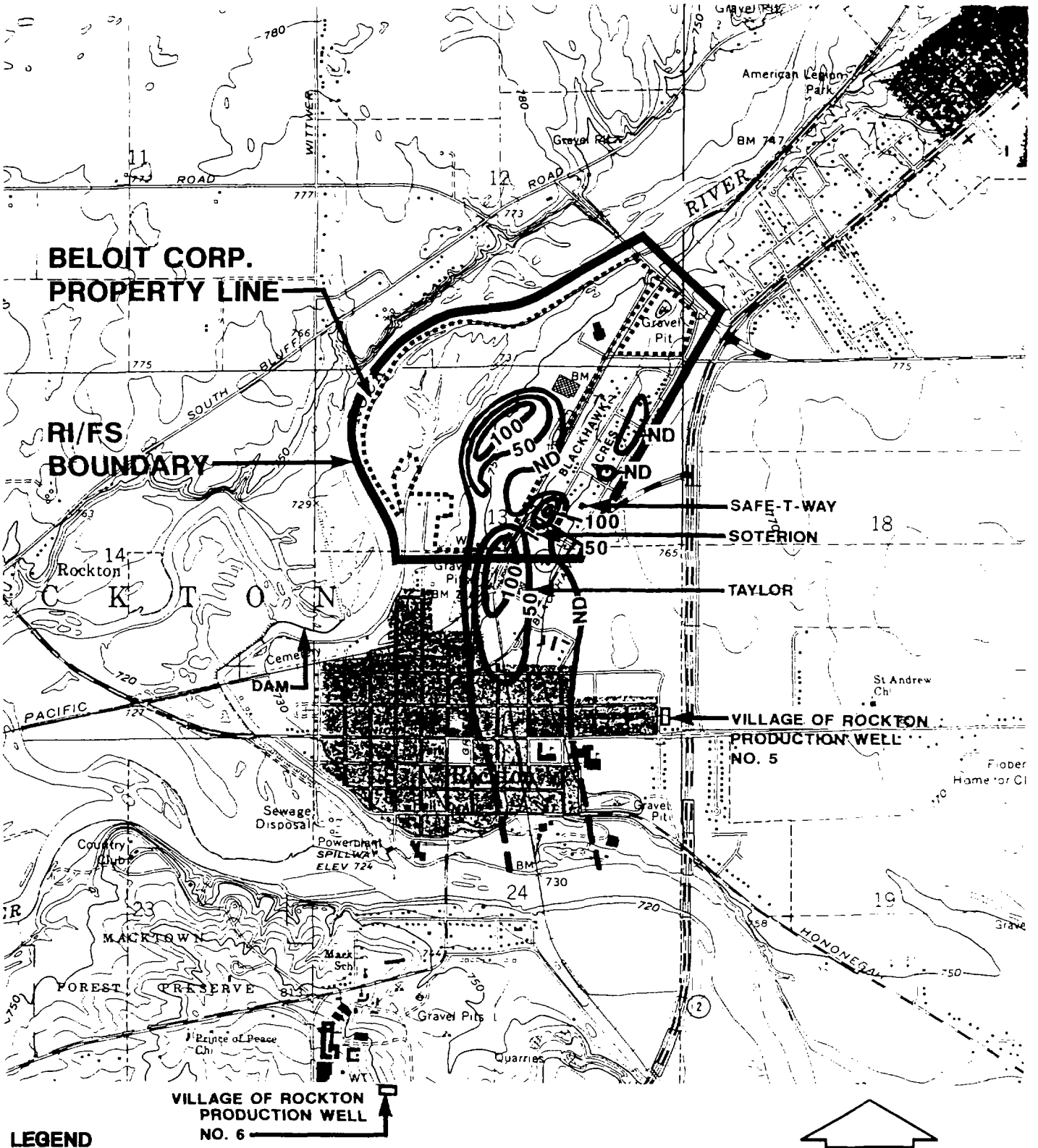
BASE MAP DEVELOPED FROM THE SOUTH BELOIT, ILLINOIS–WISCONSIN, 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP, DATED 1971.

Developed By RJR	Drawn By DLF	**SITE LOCATION MAP**
Approved By Ken Quinn	Date 7/15/98	REMEDIAL INVESTIGATION REPORT BELOIT CORPORATION BLACKHAWK FACILITY SECTIONS 12 AND 13, T46N, R1E TOWN OF ROCKTON, WINNEBAGO CO., ILLINOIS
Reference		
Revisions		

Drawing Number 1242077 08090160 **A2**

MONTGOMERY WATSON

QUALITY CONTROL
Graphic Standards — Lead Professional KWK 6-29-98 6-29-98
Technical Review KJO 6-29-98
Project Manager TAGH
Management Review
Other



LEGEND

—50— TOTAL CHLORINATED VOCs CONTOUR (ug/L) (DASHED WHERE INFERRED)

NOTE

BASE MAP DEVELOPED FROM THE SOUTH BELOIT, ILLINOIS– WISCONSIN, 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP, DATED 1971.

north

0 2000 4000

SCALE IN FEET

Developed By	RJR	Drawn By	DLF
Approved By	Ken Quinn	Date	7/15/98
Reference			
Revisions			

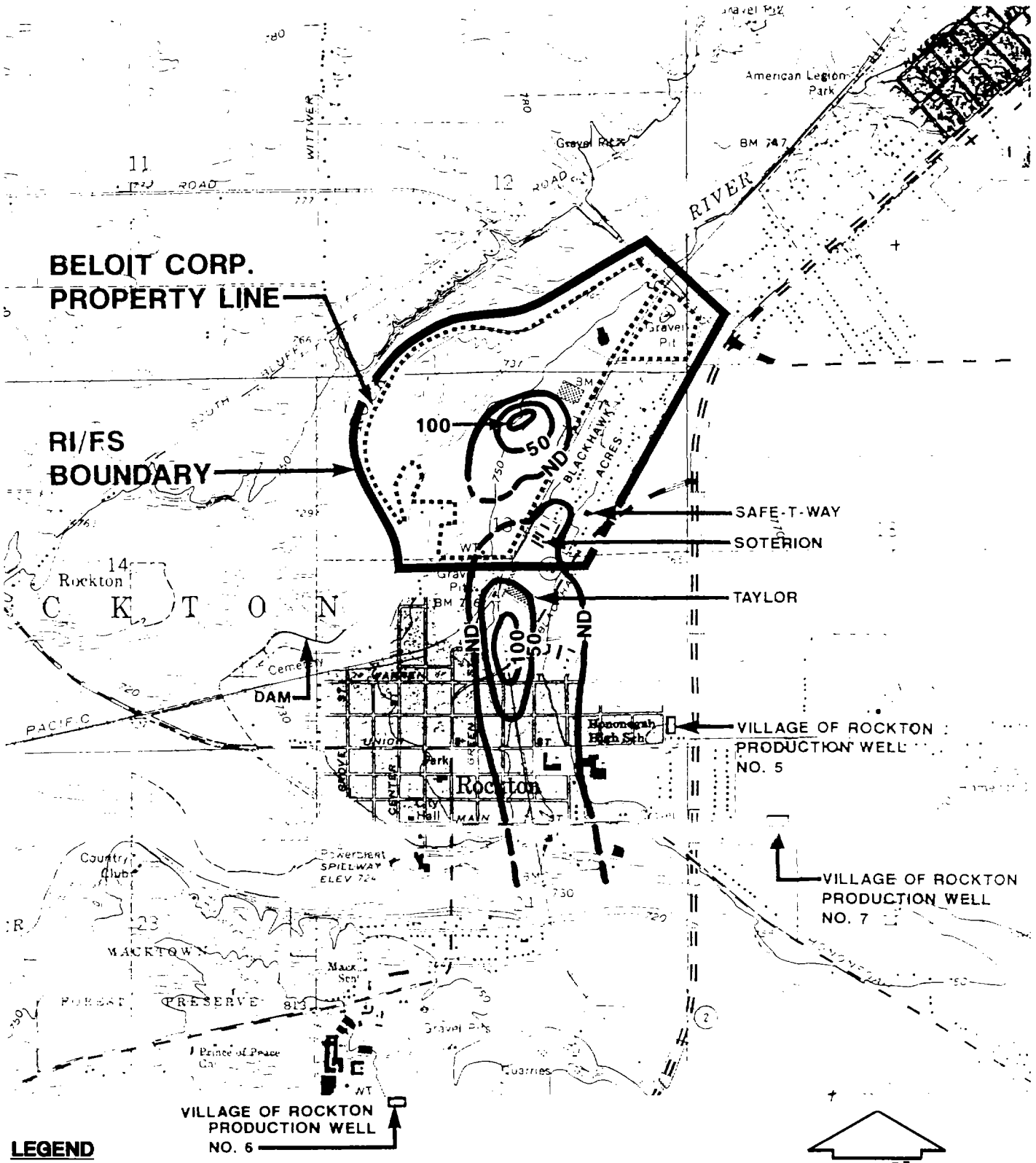
TOTAL CHLORINATED VOCs NOVEMBER 1995 - JULY 1996

REMEDIAL INVESTIGATION REPORT
BELOIT CORPORATION BLACKHAWK FACILITY
SECTIONS 12 AND 13, T46N, R1E
TOWN OF ROCKTON, WINNEBAGO CO., ILLINOIS

Drawing Number
1242077
08090160 A6

MONTGOMERY WATSON

QUALITY CONTROL | Graphic Standards — Lead Professional — Date 6-29-98 | Technical Review — Project Manager KJQ 6-29-98 | Management Review — Other



LEGEND

—50— TOTAL CHLORINATED VOCs CONTOUR (ug/L)
(DASHED WHERE INFERRED)

NOTE

BASE MAP DEVELOPED FROM THE SOUTH BELOIT, ILLINOIS– WISCONSIN, 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP, DATED 1971.

Developed By RJR	Drawn By DLF	**TOTAL CHLORINATED VOCs APRIL, 1998**	Drawing Number 1242077 08090160 A7
Approved By [signature]	Date 12/11/98	REMEDIAL INVESTIGATION REPORT BELOIT CORPORATION BLACKHAWK FACILITY SECTIONS 12 AND 13, T46N, R1E TOWN OF ROCKTON, WINNEBAGO CO., ILLINOIS	MONTGOMERY WATSON
Reference			
Revisions			

Management Review — Other
Technical Review — Project Manager KJO — 12-10-98
Graphic Standards — Lead Professional — 12-10-98
QUALITY CONTROL

A

SUMMARY OF ANALYTICAL DATA

Table A-1

Summary of Soil Data - On Beloit Corporation Property

Table A-1 - VOCs
Comparison of On-Beloit Corporation Property Soil Sample Results to TACO Tier 1 Table C Values: Industrial-Commercial Employee Exposure
Beloit Corporation

		SAMPLE	Volatiles									
AREA	SAMPLE ID	DEPTH (FT)	1,1,1-TCA	1,1-DCA	PCE	1,2-DCE [1]	2-Hexanone	MEK	Acetone	Ethylbenzene	Toluene	Xylenes (total)
BCP	BC-SSSB20-03	3								0.008		0.25
BCP	BC-SSSB23-22	22			0.003							
BCP	BC-SSSB32-09	9			0.001							
BCP	BC-SSSB32-21	21			0.039							
BCP	BC-SSSB33-10	10			0.002							
BCP	BC-SSSB33-24	24			0.111	0.004						
BCP	BC-SSSB35-13	13			0.17							
BCP	BC-SSSB35-13 (Dup)	13			0.195							
BCP	BC-SSSB35-30	30			0.433							
BCP	BC-SSSB37-08	8			0.003							
BCP	BC-SSSB37-34	34			0.16							
BCP	BC-SUSB21-00	Surface			0.004							
BCP	BC-SUSB21-90 (Dup)	Surface			0.003							
FSDA	BC-SSSB12-12	12	0.003	0.015								
FSDA	BC-SSSB12-14	14		0.003								
FSDA	BC-SSSB28-25	25					0.004	0.008				
FSDA	BC-SSSB29-28	28	0.002								0.001	
FSDA	BC-SSSSS02-01	1									0.002	
FSDA	BC-SSSSS03-01	1									0.006	
FSDA	BC-SUSB13-00	Surface							0.089			
SYA	BC-SSSB27-10	10			0.001							
SYA	BC-SSSB38-03	3			0.003							
SYA	BC-SUSG130-00	Surface			0.008				0.067			
BKD	BC-SSSB30-17	17			0.076							
BKD	BC-SSSB30-20	20			0.02							
BKD	BC-SUSG107-00	Surface							0.04			
Table C: Tier 1 - Industrial/Commercial [3]												
Industrial-Commercial												
	Ingestion (mg/kg)		--	200000	110	20000			200000	200000	410000	1000000
	Inhalation (mg/kg)		980	2400	17	1500			62000	260	520	320

Table A-1 - SVOCs

Comparison of On-Beloit Corporation Property Soil Sample Results to TACO Tier 1 Table C Values: Industrial-Commercial Employee Exposure

Beloit Corporation

			Semivolatiles														
AREA	SAMPLE ID	SAMPLE DEPTH (FT)	2,4-Dimethylphenol	2-Methylphenol	4-Methylphenol	4-Nitrophenol	Phenol	bis(2-ethylhexyl)phthalate	Di-n-octyl Phthalate	Butylbenzylphthalate	2-Methylnaphthalene	Acenaphthene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene
BCP	BC-SSSB20-03	3										0.7	0.31	0.38	0.23	0.43	
BCP	BC-SSSB21-09	9														0.045	
BCP	BC-SSSB22C-08	8															
BCP	BC-SSSB23-10	10										0.15	0.25	0.87	1 *	0.9	0.83
BCP	BC-SSSB24-10	10															
BCP	BC-SSSB34-08	8														0.042	
BCP	BC-SSSB35-30	30						0.064									
BCP	BC-SUSB16-00	Surface												0.66	0.54	1.2	
BCP	BC-SUSB21-00	Surface				0.099		0.21	0.12			0.099	0.17	0.81	0.84 *	1.7	0.42
BCP	BC-SUSB21-90 (Dup)	Surface				0.06		0.46			0.038	0.39	0.47	1.8	1.7 *	4.7	0.26
BCP	BC-SUSB30-00	Surface						0.052									
FSDA	BC-SSSB12-12	12	0.17	0.17	0.25		0.19				0.68	0.95	0.99	16 *	20 *	37 *	24
FSDA	BC-SSSB12-14	14	0.39		0.58			2.1			2.1	3.5	4.8	56 *	57 *	130 *	73
FSDA	BC-SSSB13-04	4												0.066	0.046	0.083	
FSDA	BC-SSSB13-34	34												0.036			
FSDA	BC-SSSSS02-01	1										0.23	0.46	1	1 *		0.54
FSDA	BC-SSSSS03-01	1											0.069	0.58	0.84 *	0.9	0.77
FSDA	BC-SSSSS04-01	1												0.038	0.046	0.047	
FSDA	BC-SSSSS04-01 (Dup)	1															
FSDA	BC-SSSSS05-01	1												0.15	0.24	0.35	0.17
FSDA	BC-SSSSS06-01	1										0.17	0.27	0.67	0.61	0.63	0.28
FSDA	BC-SUSB12-00	Surface						0.043									
FSDA	BC-SUSB13-00	Surface						0.053						0.088	0.097	0.24	0.17
FSSA	BC-SUSB10-00	Surface						0.05	0.074								
FSSA	BC-SUSB11-00	Surface				0.1		0.068									
FSSA	BC-SUSB11-90 (Dup)	Surface						0.069									
GP	BC-SSSB19-32	32						0.72									
SYA	BC-SSSSS01-01	1															
SYA	BC-SUSG130-00	Surface						0.11	0.15								
WWTP	BC-SSSB18-08	8						0.55									
WWTP	BC-SUSB18-00	Surface						0.058									
BKD	BC-SUSG107-00	Surface				0.1		0.2									
Table C: Tier I - Industrial/Commercial[2]																	
Industrial-Commercial																	
	Ingestion (mg/kg)		41000	100000			1E+06	410	41000	410000		120000	610000	8	0.8	8	
	Inhalation (mg/kg)		--	--			--	210	--	530		--	--	--	--	--	

Table A-1 - SVOCs

Comparison of On-Beloit Corporation Property Soil Sample Results to TACO Tier 1 Table C Values: Industrial-Commercial Employee Exposure

Beloit Corporation

AREA	SAMPLE ID	SAMPLE DEPTH (FT)	Benzo(k)fluoranthene	Carbazole	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene
BCP	BC-SSSB20-03	3	0.43	0.11	0.31		0.19	1.7	0.38		0.075	1.5	1.3
BCP	BC-SSSB21-09	9	0.045					0.056					0.052
BCP	BC-SSSB22C-08	8						0.043					0.039
BCP	BC-SSSB23-10	10	0.95	0.14	1.2		0.066	1.6	0.13	0.78		1	1.1
BCP	BC-SSSB24-10	10						0.038				0.057	
BCP	BC-SSSB34-08	8			0.037			0.039					
BCP	BC-SSSB35-30	30											
BCP	BC-SUSB16-00	Surface	1.2		0.63			1.7		0.41		0.86	0.94
BCP	BC-SUSB21-00	Surface	1.7	0.14	0.69	0.11		2.5	0.059	0.43		0.82	1.1
BCP	BC-SUSB21-90 (Dup)	Surface	4.7	0.31	1.7	0.14	0.11	5	0.23	0.48	0.062	2.3	2.3
BCP	BC-SUSB30-00	Surface											
FSDA	BC-SSSB12-12	12	37	0.87	12	3.1 *	0.52	14	0.49	22 *	1	6.4	11
FSDA	BC-SSSB12-14	14	130 *	2.5	54	9.2 *	1.4	57	2.5	57 *	3.1	27	51
FSDA	BC-SSSB13-04	4	0.083		0.059			0.16				0.12	0.11
FSDA	BC-SSSB13-34	34						0.083				0.13	0.082
FSDA	BC-SSSSS02-01	1	1.4	0.16	1.4		0.095	2.4	0.19	0.57		1.6	1.8
FSDA	BC-SSSSS03-01	1	0.84		0.94			0.96		0.7		0.31	0.76
FSDA	BC-SSSSS04-01	1	0.052		0.065			0.083					0.067
FSDA	BC-SSSSS04-01 (Dup)	1			0.041			0.045					0.04
FSDA	BC-SSSSS05-01	1	0.24		0.24			0.22		0.18		0.06	0.19
FSDA	BC-SSSSS06-01	1	0.51	0.19	0.97		0.06	1.9	0.15	0.32		1.2	1.3
FSDA	BC-SUSB12-00	Surface											
FSDA	BC-SUSB13-00	Surface	0.07		0.068			0.13		0.15		0.058	0.12
FSSA	BC-SUSB10-00	Surface											
FSSA	BC-SUSB11-00	Surface											
FSSA	BC-SUSB11-90 (Dup)	Surface											
GP	BC-SSSB19-32	32											
SYA	BC-SSSSS01-01	1			0.047			0.059					0.047
SYA	BC-SUSG130-00	Surface											
WWTP	BC-SSSB18-08	8											
WWTP	BC-SUSB18-00	Surface											
BKD	BC-SUSG107-00	Surface											
Table C: Tier I - Industrial/Commercial[2]													
Industrial-Commercial													
	Ingestion (mg/kg)		78	290	780	0.8		82000	82000	8	82000		61000
	Inhalation (mg/kg)		--	--	--	--		--	--	--	--		--

Table A-1 - Pesticides/PCBs
Comparison of On-Beloit Corporation Property Soil Sample Results to TACO Tier 1 Table C Values: Industrial-Commercial Employee Exposure
Beloit Corporation

AREA	SAMPLE ID	SAMPLED DEPTH (FT)	Pesticides/PCBs 4,4'-DDT	Aldrin	Endrin ketone	Heptachlor	Methoxychlor	Aroclor-1248	Aroclor-1254	Aroclor-1260
Beloit Corporation Property										
BCP	BC-SSSB15-22	22	0.0028			0.00065				
BCP	BC-SSSB16-22	22	0.0039			0.00096				
BCP	BC-SUSB16-00	Surface								0.011
BCP	BC-SUSB21-00	Surface							0.3	
FSDA	BC-SSSB12-12	12			0.025		0.13			
FSDA	BC-SSSB12-14	14			0.021		0.15			
FSDA	BC-SSSB13-34	34	0.0028			0.00074				
FSDA	BC-SSSSS03-01	1								0.042
FSDA	BC-SUSB13-00	Surface								0.025
FSSA	BC-SSSB09-16	16	0.0041			0.001				
FSSA	BC-SSSSS07-01	1	0.0032							
FSSA	BC-SSSSS07-01 (Dup)	1	0.0023							
FSSA	BC-SSSSS10-01	1							0.1	
FSSA	BC-SSSSS11-01	1							0.042	
GP	BC-SUSB19-00	Surface						0.024		
SYA	BC-SSSB26-00	Surface							0.054	
SYA	BC-SSSB27-00	Surface		0.0018					0.039	
WWTP	BC-SUSB18-00	Surface							0.36	
Table C: Tier 1 - Industrial/Commercial[2]										
Industrial-Commercial										
	Ingestion (mg/kg)		17	0.3	610	1	10000	1	1	1
	Inhalation (mg/kg)		120	0.8	--	0.5	--	--	--	--

Table A-1 - Metals
Comparison of On-Beloit Corporation Property Soil Sample Results to TACO Tier 1 Table C Values: Industrial-Commercial Employee Exposure
Beloit Corporation

AREA	SAMPLE ID	SAMPLE DEPTH (FT)	Metals Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium, to	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Vanadium	Zinc	Cyanide
Beloit Corporation Property																									
BCP	BC-SSSB15-22	22	2010		1.5	13.7		3.5	46300	100	4.3	16.8	15700	2.6	25200	290		12.1	570					33.9	
BCP	BC-SSSB16-22	22	3690		0.65	20.6		1.3	47800	6.7	3	9.7	5860	4.3	28300	122	0.05	10.2	478		2.4		13.6	24.9	
BCP	BC-SSSB20-03	3	1810	11.8	2.3	8.4		1.8	73900	7.5	4.7	6.2	6240	2.2	36900	174		4.9	270					11.8	
BCP	BC-SSSB21-09	9	9290		3	94.2		2.6	1650	11.6	7.2	7.2	11800	7	1500	430		8.8	567				22.9	30.5	
BCP	BC-SSSB22C-08	8	1430		1.2	10.5			44700	5.6	1.5	7.3	3230	4.3	26100	119			244						
BCP	BC-SSSB23-10	10	1420		1.6	8.7			98300	2.7	2.1	7.7	4360	1.6	52000	179			190				6.8		
BCP	BC-SSSB23-22	22	3690		1.2	20			86000	7.6		10.8	7520	25.5	40600	215			658				13.5	45.2	
BCP	BC-SSSB24-10	10	1790			8.7			81100	2.9	2.4	13.3	5400	1.5	44500	176							9.1		
BCP	BC-SSSB25-10	10	1160		1.4	6.2			82000	2.8	2.1		3450	1.2	41000	137							5.6		
BCP	BC-SSSB32-09	9	1670			8.5			105000	2.7	2.3		4880	1.2	62900	187							8.3		
BCP	BC-SSSB32-21	21	4600			20.7	0.22		68300	8.6	4.8	18	10400	3.9	41100	245			763				20.8	41.9	
BCP	BC-SSSB33-10	10	1660		2.3	12.5	0.17		129000	5.9	3.2	11.4	9100	2.8	75300	534							11	25.4	
BCP	BC-SSSB33-24	24	3770		1.5	31.4	0.21		84900	8	6.4	15.7	14900	3.3	40000	629		15.7	671				20.6	30.1	
BCP	BC-SSSB34-08	8	1730		1.1	9.3	0.1		126000	2.3		7.8	3730	1.7	75900	171			188				7.9		
BCP	BC-SSSB35-13	13	2070		1.3	12	0.13		112000	2.7	2.8	12.6	5160	1.6	68300	182			320				8.5		
BCP	BC-SSSB35-30	30	2820		2	15.8	0.11		74600	5.7	3.3	9	6980	3.5	36400	217			422				12		
BCP	BC-SSSB36A-08	8	1860		1.1	10.2			85900	4.9		6.1	5390	17.5	48900	213			314				8.4		
BCP	BC-SSSB37-08	8	11600		4.4 *	74.1	1.1 *		47000	19.4		12	17400	7.5	28800	554			622				29.1	36.7	
BCP	BC-SSSB37-34	34	3220		2.4	14.5			102000	3.6		9.2	7090	3.4	47700	224			641				11.5		
BCP	BC-SUSB16-00	Surface	1060		1.1	22		3.5	99700	73.4	4.1	20.4	16900	827 *	52500	284		60.2	307			488		119	
BCP	BC-SUSB21-00	Surface	1130		2.6	17		2.7	155000	43.9	4.2	17	9580	9.5	80600	261		39.7	648					35.9	
BCP	BC-SUSB21-90 (Dup)	Surface	1840		3.7 *	19.5		2.9	147000	40.5	4	22.9	10600	11.5	73900	270		33.6	724		2.5			48.7	
BCP	BC-SUSB30-00	Surface	6090		3.3 *	98.8		2	3760	7	5.2	7.5	8040	31	1410	422		8.7	712	0.53			16.9	37.3	
FSDA	BC-SSSB12-12	12	3770		3	36.8		3	2430	35.7	8.4	115	16400	24.6	4110	546	0.08	89.2	359					63.6	
FSDA	BC-SSSB12-14	14	3790		10.7 *	53.8		11.5	6300	60.4	16.8	311	51000	216	11400	1400		268	487	0.62			34.2	311	
FSDA	BC-SSSB13-04	4	7530		2.7	64.3		2.2	13300	9.5	4.6	7.1	10300	6.2	8510	333		8.4	466		2.9		18.8	24.7	
FSDA	BC-SSSB13-34	34	3300		1.7	13.4		1.7	81700	5.2	3.1	5.9	7320	3.5	37900	250		8	616		2.1		10.7	21.4	
FSDA	BC-SSSB13-34 (Dup)	34	3830		1.1	16.1		1.5	82500	17.2	3.6	7.5	7010	2.7	41600	252		9.4	773		2.4			15.7	
FSDA	BC-SSSB28-25	25	862		0.64	5.9			28100	4.1		3.2	2340	1.1	16300	106			202				2.9		
FSDA	BC-SSSB28-32	32	7500		3.3 *	37.4	1		93800	10.2		14.5	12800	7.3	42200	306			1340				17.9	51.6	
FSDA	BC-SSSB29-28	28	1460		0.67	7.5			38700	6.1		4.9	5410	1.4	18200	95.8			279				8.5		
FSDA	BC-SSSSS02-01	1	2660	7.8	0.45	20.5	0.29		131000	63.2	4.2	1550	9580	12.3	82000	292		65.9	452				8.7	130	
FSDA	BC-SSSSS03-01	1	5610		2.1	92.6	0.4		6130	13.9	4.5	11.7	7970	11.9	2980	542		12.2	578				13.8	38.6	
FSDA	BC-SSSSS04-01	1	5790		2.2	73.1	0.34		10700	7.3	4.7	7.3	8340	9.7	6630	410			387				15.2	31.9	
FSDA	BC-SSSSS04-01 (Dup)	1	6260		2.1	73.6	0.29		11200	9.2	3.4	7.5	8070	12.8	5780	368			367	0.29			14.9	43.9	0.62
FSDA	BC-SSSSS05-01	1	6320	8.7	2.9	63.3	0.33		6770	12.8	4.4	7.3	9280	7.7	3460	389		14.9	261				16.2	22.7	0.81
FSDA	BC-SSSSS06-01	1	11100		5.1 *	75.6	0.53		5680	13.7	6.9	10.7	15700	9.3	4160	521		14.3	522				26.2	31	
FSDA	BC-SUSB12-00	Surface	5120		3	61.7		2.2	2510	7.7	5.7	5.5	7540	8.8	1910	365		6.4	463				16.3	28.6	
FSDA	BC-SUSB13-00	Surface	5280		1.8	66.8		2.2	2880	7.1	5.5	6.6	8040	8.6	1880	412		6.4	471	0.71			15.3	25	
FSSA	BC-SSSB09-16	16	2230		1	11.7		1	76600	5.1	3.7	7.2	6960	1.7	38400	250		6.2	300		2.5		13.7	13.1	
FSSA	BC-SSSB10-06	6	1340		0.98	8		1.4	93100	3.7	3.7	3.1	3710	2.2	51900	144			239		2.5			8.4	
FSSA	BC-SSSB10-30	30	3670		0.95	18.2		1.9	76300	5.9	5	7.5	6790	3.4	33200	215		7.3	697					40.6	
FSSA	BC-SSSB11-10	10	2000		1.1	11.7		2.3	59900	2.9	5.1	23.5	13500	1.9	32000	306	0.05	6.4	224				17.3	23.9	
FSSA	BC-SSSB11-20	20	1500		1	6		1	76900	6		6.4	4670	1.6	37300	202		7.6	163					8.2	
FSSA	BC-SSSSS07-01	1	6960		2.1	126	0.42		2190	9.3	5.8	8.7	10200	13.4	1410	666			516	0.26			18.9	35.4	0.64
FSSA	BC-SSSSS07-01 (Dup)	1	8050		2.6	128	0.48		2360	10.3	5.7	9.4	10700	12.9	1530	655			576				19.3	37.6	
FSSA	BC-SSSSS08-01	1	7450		3.5 *	107	0.48		2040	10.6	5.4	9.5	11600	14.1	1410	628		12.4	445	0.31			21.6	33.6	0.91
FSSA	BC-SSSSS09-01	1	8300		3.8 *	118	0.62		2090	12	6.4	9.3	12300	17.8	1440	675			548				23	36.7	0.71
FSSA	BC-SSSSS10-01	1	4000		1.6	41.1	0.29	0.56	22700	6.3	3.9	12.1	6140	6.9	13400	231	0.16		316				12.7	28.4	
FSSA	BC-SSSSS11-01	1	6780		2.6	82.2	0.46		13700	10.6	5.8	13.6	10200	11.1	7920	491	0.39		446				20.2	39.7	
FSSA	BC-SUSB10-00	Surface	12900		4.8 *	126		4.3	2460	19.3	8.1	9.8	16000	12.8	1990	681		13.4	1050				36.5	42.9	
FSSA	BC-SUSB11-00	Surface	6450		2	61.6		2.7	11000	8.6	5.3	9.3	8350	11.2	6440	361	0.35	10.7	589	0.63	2.9		19	33.5	
FSSA	BC-SUSB11-90 (Dup)	Surface	6540		2	67.2		2.7	4320	7.3	6.2	9.1	9380	10.6	2600	422	0.33	8	530				19	31.1	
GP	BC-SSSB19-14	14	1210		1.1	5			40600	3.9	3.3	4.1	3230	1.7	19200	97.5	0.04		151					8.3	
GP	BC-SSSB19-32	32	1980		2	9.6		1.9	60600	5.1	3.2	5.5	4900	2.4	24200	158	0.65	6.2	354		2.3			16	
GP	BC-SUSB19-00	Surface	5090		2.7	47.1		1.9	27200	5.1	4.7	12.8	8050	5.1	4390	295	0.18	6.6	358				14.8	22.7	
SYA	BC-SSSB14-24	24	1400		1.2	7.8		1.4	88000	6.2	2.7	4.9	4790	2	45000	164		4.7	236					10.5	
SYA	BC-SSSD26-00	Surface	496		0.9	9.8	0.21		198000	1.9	1.6		3320	8.8	129000	297			202				3.8	19.7	
SYA	BC-SSSB26-08	8	1750		1.1	11.9			113000	5.1		8.9	4320	17.5	62400	238			351				8.1		
SYA	BC-SSSB27-00	Surface	7270		3.1 *	110	0.48		1320	9.2	5.4	8.7	10700	13.2	1170	605			269	0.35			20.2	39.2	
SYA	BC-SSSB27-10	10	1920			9.8			63500	3.7	2.4		5110	1.9	29600	138							8.7	16.6	
SYA	BC-SSSB38-03	3	2620		1.2	32			120000	3.8		8	9300	1.8	68800	268			591				12.8		
SYA	BC-SSSB38-08	8	1240		1	5.4			65800	3.1		5.1	3800	1.4	27300	137			242				6.4		
SYA	BC-SSSSS01-01	1	520		0.93	6	0.23		203000	2.4		5.7	3420	10.8	131000	261			232				4.3	20.9	
SYA	BC-SUSQ130-00	Surface	8990		3.1 *	113		3.5	1340	41	8.1	7.2	12100	9	1320	581		10.4	576	0.48			24.5	33.6	
WWTP	BC-SSSB18-08	8	2320		0.91	18.1		1.3	13000	5.1	2.6	4.9	3640	3.3	9220	82	0.17		251					14.9	
WWTP	BC-SSSB18-12	12	4370		0.89	20.2		1.2	11900	5.7	4	6.4	5160	3	7840	52.2	0.66	6.7	410						
WWTP	BC-SUSB18-00	Surface	3210		3.5 *	26.9		1.3	32000	5.4	3.6	10.5	5130	10	17400	198	0.28	8.1	292				11.2	27.6	

Table A-1 - Metals
Comparison of On-Beloit Corporation Property Soil Sample Results to TACO Tier 1 Table C Values: Industrial-Commercial Employee Exposure
Beloit Corporation

AREA	SAMPLE ID	SAMPLE DEPTH (FT)	Metals Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium, to	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Selenium	Silver	Sodium	Vanadium	Zinc	Cyanide
Background																									
BKD	BC-SSSB30-17	17	2320		1.6	11.1	0.11		95000	5.8	3.4	10.8	6680	2.3	42700	191							10	35.1	
BKD	BC-SSSB30-20	20	4500			21.8	0.15		61000	7.4	5.1	13.4	7810	3.3	36700	196							22.9	37.7	
BKD	BC-SSSS12-01	1	4700		2.1	98.6		0.82	2220	7.3	2.7	7.5	7790	23.1	948	510		7.4					14	40.6	
BKD	BC-SSSS13-01	1	3460		1.4	47.6			1170	4.1		4.9	4340	19.9	584	229		2.6					7.9	23.4	
BKD	BC-SSSS14-01	1	4110		3.9 *	74.2			2450	5.2	2.2	6.3	4960	19.1	1180	270		4.1					9.7	21.4	
BKD	BC-SSSS15-01	1	4790		1.6	73			1160	6.1	2.4	5.3	6300	18.2	866	310		4.2					12.1	24.6	
BKD	BC-SSSS16-01	1	8100		2.4	93.6			1900	10.3	4.5	8.9	11200	16.5	1450	500		7.4					19.6	34.1	
BKD	BC-SUSG107-00	Surface	1190		1.2	8.5		1.2	149000	4.2	3.1	4.4	4140	4.8	73500	246		7.1	306		2.5			24.4	
Table C: Tier 1 - Industrial/Commercial[2]																									
	Industrial-Commercial																								
	Ingestion (mg/kg)			820	3	140000	1	1000		10000	120000	76000	--	400		100000	610	41000		10000	10000		14000	610000	41000
	Inhalation (mg/kg)			--	230	500000	1200	1500		230	--	--	--	--		50000	300000	12000		--	--		--	--	--

Notes:
1. This table provides a comparison of risk-based clean-up objectives to concentrations of chemicals in soil. The risk-based concentration limits were obtained from *Tiered Approach to Clean-up Objectives Guidance Document* (TACO), dated January 1996 (IEPA 1996). All results are in mg/kg. Only compounds detected in at least one sample are included in this table. A blank in the results section indicates the compound was not detected in that sample. A blank in the Tier 1 standards row(s) indicates no standard(s) exist. * = concentration exceeds the applicable Tier 1 clean-up objective.

2. The Table C, Industrial/Commercial clean-up objectives were obtained from TACO (IEPA 1993). The IEPA developed clean-up objectives based on two different exposure scenarios common to industrial/commercial sites. These include a construction worker scenario, and a long-term scenario. The lesser of the appropriate clean-up objectives (soil ingestion, inhalation of soil derived vapors) were used to compare to the analytical data

Footnotes:
1. For 1,2 dichloroethene, samples were reported as the total of both the cis- and trans- isomers. TACO values for the trans- isomer, which are lower than those for the cis- isomer, are used to be conservative.

Legend:
BCP - Beloit Corporation Plant
FSDA - Foundry Sand Disposal Area
FSSA - Former Fiber Sludge Spreading Area
GP - Gravel Pit
SYA - Storage Yard Area
WWTP - Waste Water Treatment Plant on Beloit Corporation Property

Table A-2

Summary of Soil Data - Off Beloit Corporation Property

Table A-2
Comparison of Off-Beloit Corporation Property Soil Sample Results to TACO Tier 1 Table C Values: Industrial-Commercial Employee Soil Exposure Objectives
Beloit Corporation

		Volatiles							Semivolatile						
AREA	SAMPLE ID	MIBK	2-Hexanone	MEK	Benzene	Toluene	Carbon disulfide	Chloroform	bis(2-ethylhexyl)phthalate	Di-n-butylphthalate	Butylbenzylphthalate	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene
Off-site Soils															
RE	BC-SSSB17-16							0.001							
RE	BC-SUSB17-00								0.19	0.38	2	0.075	0.25	0.24	0.32
SO	BC-SSSB08-02	0.005	0.01	0.076	0.004	0.003	0.011								
SO	BC-SSSB08-12	0.009	0.016	0.089	0.003	0.002	0.002								
SO	BC-SSSB08-12D	0.009	0.02	0.12											
SO	BC-SUSB08-00														
Table C: Tier I - Industrial/Commercial [1]															
Industrial-Commercial															
	Ingestion (mg/kg)				200	410000	200000	940	410	200000	410000	610000	8	0.8	8
	Inhalation (mg/kg)				0.9	520	13	0.3	210	100	530	--	--	--	--

										Metals					
AREA	SAMPLE ID	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	Aluminum	Antimony	Arsenic	Barium	Cadmium	Calcium
Off-site Soils															
RE	BC-SSSB17-16									1540		0.98	10.3	1.5	79200
RE	BC-SUSB17-00	0.25	0.14	0.27	0.068	0.52	0.24	0.32	0.33	3590		3.5 *	75.3	6	67900
SO	BC-SSSB08-02							0.26		4900	70.5	24.1 *	216	53.8	2790
SO	BC-SSSB08-12							0.33	0.25	2730	94	22.2 *	167	62.3	5050
SO	BC-SSSB08-12D							0.28		2430	63.1	25.5 *	132	46.1	11200
SO	BC-SUSB08-00									1990	13	4.4 *	64.1	13.4	31000
Table C: Tier I - Industrial/Commercial [1]															
Industrial-Commercial															
	Ingestion (mg/kg)		78	780	0.8	82000	8		61000		820	3	140000	1000	
	Inhalation (mg/kg)		--	--	--	--	--		--		--	230	500000	1500	

Table A-2
Comparison of Off-Beloit Corporation Property Soil Sample Results to TACO Tier 1 Table C Values: Industrial-Commercial Employee Soil Exposure Objectives
Beloit Corporation

AREA	SAMPLE ID	Chromium, total	Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Silver	Sodium	Vanadium	Zinc
Off-site Soils															
RE	BC-SSSB17-16	4.8	2.9	5.7	4500	2.1	35800	212		6.7	286	3.4			12.4
RE	BC-SUSB17-00	23.1	5.7	138	22200	69.5	37000	412	0.07	168	579			12.8	152
SO	BC-SSSB08-02	13100 *	731	295	264000	9.5	1730	1010	0.26	826	498	37.6		4170	59.6
SO	BC-SSSB08-12	14200 *	1160	335	308000	13.7	2610	1140	0.07	929	300	40.7		4660	181
SO	BC-SSSB08-12D	10600 *	696	246	226000	16.6	5960	884		656	274	27.4		3510	104
SO	BC-SUSB08-00	2650 *	163	66.3	59900	37.2	18000	281		171	207	5.4	997	894	755
Table C: Tier I - Industrial/Commercial [1]															
Industrial-Commercial															
	Ingestion (mg/kg)	10000	120000	76000	--	400		100000	610	41000		10000		14000	610000
	Inhalation (mg/kg)	230	--	--	--	--		50000	300000	12000		--		--	--

Notes:
1. This table provides a comparison of risk-based clean-up objectives to concentrations of chemicals in soil. The risk-based concentration limits were obtained from *Tiered Approach to Clean-up Objectives Guidance Document* (TACO), dated January 1996 (IEPA 1996). All results are in mg/kg. Only compounds detected in at least one sample are included in this table. A blank in the results section indicates the compound was not detected in that sample. A blank in the Tier I standards row(s) indicates no standard(s) exist. * = concentration exceeds the applicable Tier I clean-up objective.

Footnote:
1. The "Table C: Industrial/Commercial" clean-up objectives were obtained from TACO (IEPA 1993). The IEPA developed clean-up objectives based on two different exposure scenarios common to industrial/commercial sites. These include a construction worker scenario, and a long term employee scenario. The lesser of the appropriate clean up objectives (i.e., ingestion or inhalation) were used to compare to the analytical data.

Legend
RE = Rockton Excavating
SO = Soterion Property

Table A-3

Summary of Monitoring Well Data

Table A-3 - VOCs
Comparison Of Groundwater Monitoring Well Results to TACO Tier Table C Values: Consumption of Class I Groundwater by Employee Population
Beloit Corporation

	VOLATILES									
SAMPLE ID	PCE	TCE	1,1-DCE	1,2-DCE[1]	1,1,1-TCA	1,1-DCA	1,2-DCA	Carbon disulfide	CCl4	Chloromethane
BC-GWG103D-02		0.004								
BC-GWG104-01	0.004	0.002			0.024	0.015				
BC-GWG104-02	0.003									
BC-GWG108D-02										0.018
BC-GWG108D-03		0.002								
BC-GWG109-01					0.005	0.003				
BC-GWG109-02					0.005					
BC-GWW03R-01	0.005				0.006	0.001				
BC-GWW03R-02	0.008 *									
BC-GWW03R-03	0.008 *				0.002					
BC-GWW05R-01	0.012 *	0.003	0.003		0.045	0.007				
BC-GWW05R-02	0.033 *	0.009 *		0.003	0.034	0.003				
BC-GWW05R-03	0.022 *	0.007 *	0.006		0.048					
BC-GWW18-01		0.024 *			0.004					
BC-GWW18-02		0.036 *			0.008					
BC-GWW18-03		0.027 *			0.008					
BC-GWW18-91		0.02 *			0.004					
BC-GWW19-01					0.002					
BC-GWW19-03					0.003					
BC-GWW20-01				0.009	0.016					
BC-GWW20B-01	0.006 *	0.005			0.008					
BC-GWW20B-02				0.033	0.02					
BC-GWW20B-91	0.001		0.001	0.01	0.019	0.001				
BC-GWW20R-02	0.024 *	0.012 *			0.008					
BC-GWW21-01	0.031 *	0.019 *			0.022	0.002				
BC-GWW21-02	0.09 *	0.023 *			0.017					
BC-GWW21-03	0.044 *	0.03 *			0.022					
BC-GWW21B-01		0.002			0.025					
BC-GWW21B-02		0.016 *	0.026 *		0.16					
BC-GWW21B-03		0.009 *	0.002	0.003	0.03					
BC-GWW21B-93		0.006 *	0.003	0.003	0.023					
BC-GWW22B-01								0.002		
BC-GWW23-01	3 *									
BC-GWW23-02	4.3 *									
BC-GWW23-03	1.6 *									
BC-GWW23B-01	0.97 *	0.033 *			0.047		0.32 *			
BC-GWW23B-02	1.6 *	0.06 *		0.48 *						
BC-GWW23B-03	1.6 *	0.061 *		0.47 *	0.021					
BC-GWW25C-01		0.001			0.01					
BC-GWW25C-02	0.011 *	0.004	0.008 *		0.11					
BC-GWW25C-03	0.003	0.004	0.006		0.045					
BC-GWW26C-01		0.061 *			0.016					
BC-GWW26C-02		0.16 *	0.003		0.05					
BC-GWW26C-03		0.11 *	0.005		0.033					
BC-GWW28-02										0.011
BC-GWW31C-02	0.06 *			0.002	0.009					
BC-GWW31C-03	0.072 *	0.002	0.006	0.004	0.019					
BC-GWW34-02	0.023 *									
BC-GWW34-03	0.012 *									
BC-GWW34-92	0.02 *									
BC-GWW35C-02	0.003				0.04					
BC-GWW38-02	0.37 *									0.081

Table A-3 - VOCs
Comparison Of Groundwater Monitoring Well Results to TACO Tier Table C Values: Consumption of Class I Groundwater by Employee Population
Beloit Corporation

	VOLATILES										
	SAMPLE ID	PCE	TCE	1,1-DCE	1,2-DCE[1]	1,1,1-TCA	1,1-DCA	1,2-DCA	Carbon disulfide	CCl4	Chloromethane
	BC-GWW38-03	0.25 *	0.005			0.006					
	BC-GWW39-02	0.029 *									
	BC-GWW40-02	0.006 *				0.007					
	BC-GWW41-02	0.13 *				0.018					
	BC-GWW41-03	0.031 *				0.009					
	BC-GWW41-93	0.031 *				0.009					
	BC-GWW43C-04		0.13 *	0.007	0.002	0.008	0.014				
	BC-GWW43C-94		0.13 *	0.007		0.008	0.014				
	BC-GWW47C-04		0.065 *	0.003		0.019	0.012			0.003	
	BC-GWW48C-04		0.03 *	0.001		0.006					
Table C: Tier I - Industrial/Commercial											
Groundwater											
	Class I (mg/L)	0.005	0.005	0.007	0.07	0.2	0.7	0.005	0.7	0.005	

Table A-3 - SVOCs/Pesticides
Comparison Of Groundwater Monitoring Well Results to TACO Tier I Table C Values: Consumption of Class I Groundwater by an Employee Population
Beloit Corporation

	SEMIVOLATILES					PESTICIDES	
	SAMPLE ID	Di-n-butylphthalate	Diethylphthalate	Dimethylphthalate	Phenol	Endrin aldehyde	Heptachlor
	BC-GWG110-01					0.000003	
	BC-GWG110-91					0.000003	
	BC-GWW14-01					0.000004	
	BC-GWW20B-01					0.000002	
	BC-GWW20B-91					0.000003	
	BC-GWW21B-01		0.001			0.000004	
	BC-GWW22B-01					0.000003	
	BC-GWW22C-01					0.000005	
	BC-GWW23B-01	0.001	0.002				
	BC-GWW26C-01	0.001	0.002	0.001			0.00016
	BC-GWW41-02				0.002		
Table C: Tier I - Industrial/Commercial							
Groundwater							
	Class I (mg/L)	0.7	5.6	7	0.1	0.02	0.0004

Table A-3 - Metals
Comparison Of Groundwater Monitoring Well Results to TACO Tier 1 Table C Values: Consumption of Class I Groundwater by an Employee Population
Beloit Corporation

	METALS																	
SAMPLE ID	Aluminum	Arsenic	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Potassium	Silver	Sodium	Zinc
BC-GWG103D-01			0.013		54							31.7				1.92		4.98	
BC-GWG104-01			0.026		91.7					0.03		38.4				0.87		13	
BC-GWG108D-01			0.032		85.7	0.015				0.097		39.7	0.022		0.041	1.17		15	0.026
BC-GWG109-01			0.025		87.5					0.025		37.1				1.67		11.1	
BC-GWG110-01		0.0023	0.052		86.1					0.536		37.8	0.334 *			3		22.8	
BC-GWG110-91		0.0025	0.056		85.6					0.869		37.1	0.367 *			2.92		21.3	
BC-GWW01R-02			0.0396		92.9					0.0333		42.4				1.7		34.2	
BC-GWW03R-01			0.023	0.005	87.6							31.4				0.78		7.93	
BC-GWW03R-02			0.0293		72.4			0.0134				31.3		0.00032				8.34	0.0467
BC-GWW05R-01			0.014		72.4						0.0034	32	0.036			0.65		5.55	
BC-GWW12R-02			0.0757		70.1			0.0035				28.6				1.41		4.78	0.0035
BC-GWW13-01			0.069		103							38.6	0.013			1.03	0.01	6.61	
BC-GWW14-01			0.025		100							36.8	0.138		0.305 *	1.54		37.3	
BC-GWW14-02			0.0171		78.6					0.0283		30.1	0.0153		0.251 *	1.21		30.6	
BC-GWW15-01	0.062		0.229		209					0.098		86.3	0.286 *		0.877 *	8.54	0.011	447	0.022
BC-GWW15-02			0.135	0.0058 *	153		0.0049			0.0324		68.5	0.0397		0.304 *	5.37		298	0.0018
BC-GWW16R-01			0.029		84.3					0.021		38.1				0.58		2.76	
BC-GWW17-01			0.024		103							40.5	0.013			0.46		3.7	
BC-GWW18-01			0.017		69.8				0.008			33.9				1.07		5.13	
BC-GWW18-91			0.017		73.3				0.005	0.032		34.9				1.1		4.05	
BC-GWW19-01			0.021		83.8							35.1				1.16		7.78	
BC-GWW19B-01			0.022		90.9					0.051		37.6	0.266 *			1.07		12.7	
BC-GWW20-01			0.022		99.4							41.2				0.76		7.42	
BC-GWW20B-01			0.018	0.005	89							37.8	0.15			0.71		3.26	
BC-GWW20B-02			0.0133		71.5							34.7	0.0241					2.17	0.0434
BC-GWW20B-91			0.019		86					0.058		36.4	0.153 *			0.67		2.96	
BC-GWW21-01			0.028		72.4							33.2	0.035			0.6		2.8	
BC-GWW21B-01			0.014		65.4							30.1				0.95		2.22	
BC-GWW22-01			0.03		78.8							42.5	0.023			1.32		3.23	
BC-GWW22B-01			0.017		79							44.4				1.01		3.56	
BC-GWW22C-01			0.018		73.7							36.7				1.34		5.11	
BC-GWW23-01			0.056		139			0.015				68.1	0.127		0.028	1.65		10.5	
BC-GWW23B-01			0.028		93.3							43	0.034			1.04		27.7	
BC-GWW25C-01			0.019		70.1							33.6	0.016			1.27		2.82	
BC-GWW26-02			0.035		69.3			0.0029				32.7				0.482		3.25	
BC-GWW26-92			0.0337		69.8					0.0262		32.6				0.463		3.53	
BC-GWW26C-01			0.027		62.4				0.009			33.5				1.01		11.9	
BC-GWW31C-02			0.0968		94.4			0.0036				45.7	0.0308		0.0132	1.61		19.8	
BC-GWW32-02	0.126		0.112		91.5					0.217		46.7	0.0304			2.04		5.53	
BC-GWW34-02			0.139		128			0.0044				66.2			0.0357	1.83		56	
BC-GWW35C-02			0.0764		90.8					0.033		48.2	0.0282		0.0086	2.59		14.9	
BC-GWW39-02			0.106	0.0024	86.1							32.5				2.18		8.71	
BC-GWW40-02			0.0802		69.2							41.9	0.0367			3.88		10.3	
BC-GWW41-02			0.0729		75.2							23.6				0.987		6.69	
BC-GWG107-01			0.033		95.8							46.9				0.8		7.14	
BC-GWG107-02			0.0268		73.1			0.0048				39.4	0.0344		0.0989			6.05	
BC-GWG107-91			0.029		94.8							46.3				0.77		6.78	0.017
BC-GWW08R-01			0.03		83.9							35.1	0.085			1.25		30.7	
BC-GWW08R-02			0.0382		94.3			0.0038				38.3	0.0281		0.0564	1.1		113	0.0033
BC-GWW11R-01			0.016		77							33.8	0.026			1.22	0.01	24.6	
BC-GWW11R-02			0.0325		96.3					0.423		39.8	0.082		0.591 *	1.11		104	0.0023
BC-GWW11R-92			0.0298		94.7					0.347		39.2	0.0756		0.573 *	1		104	0.0018
BC-GWW24-01			0.054	0.005	113							56.9	0.145			3.59		8.97	
BC-GWW24-02	0.0607		0.0697		126					0.0479		59.8				3.95		6.49	
Table C: Tier 1 - Industrial/Commercial																			
Groundwater																			
Class I (mg/L)		0.05	2	0.005		0.1	1	0.65	0.2	5	0.0075		0.15	0.002	0.1		0.05		5

Notes:

1. This table provides a comparison of risk-based groundwater clean-up objectives to concentrations of chemicals in monitoring well located on the NPL site. The risk-based concentration limits were obtained from *Tiered Approach to Clean-up Objectives Guidance Document* (TACO), dated January 1996 (IEPA 1996). All results are in mg/L. Only compounds detected in at least one sample are included in this table. A blank in the results section indicates the compound was not detected in that sample. A blank in the Tier I standards row(s) indicates no standard(s) exist. * = concentration exceeds the applicable Tier I clean-up objective.

Table A-4

Summary of Private Well Data

TABLE 4-18

Summary of Organic Compounds Detected in Private Wells
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

	1,1,1-Trichloroethane						1,1-Dichloroethane						Chloromethane					Tetrachloroethene						Trichloroethene						1,1-Dichloroethene					Chloroform					1,4-Dichlorobenzene					Methylene chloride					Dichlorodifluoromethane				
Address	1992	1994	1996	1997	1998	2/1999	1992	1994	1996	1997	1998		1992	1994	1996	1997	1998	1992	1994	1996	1997	1998	2/1999	1992	1994	1996	1997	1998	2/1999	1992	1994	1996	1997	1998	1992	1994	1996	1997	1998	1992	1994	1996	1997	1998	1992	1994	1996	1997	1998
112 Blackhawk	NS	NS	NS	NS		NS	NS	NS	NS	NS			NS	NS	NS	NS		NS	NS	NS	NS	4.2	NS	NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS	
630 Blackhawk	NS	NS	NS	NS	1.8	2	NS	NS	NS	NS			NS	NS	NS	NS		NS	NS	NS	NS	1.5	0.7	NS	NS	NS	NS	5	4	NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS	
908 Blackhawk			NS		NS	NS			NS		NS				NS		NS	0.7		NS		NS	NS			NS		NS	NS			NS				NS		NS				NS		NS				NS		NS	
916 Blackhawk			NS		NS	NS	0.7		NS		NS				NS		NS			NS		NS	NS			NS		NS	NS			NS				NS		NS				NS		NS				NS		NS	
1012 Blackhawk (1)	2	0.7			NS	NS	0.7				NS						NS	0.7				NS	NS	4	0.9			NS	NS									NS								NS				NS	
1102 Blackhawk (1)	9	7		1	NS		3	2			NS						NS					NS		14	13	8.8	1	NS										NS								NS				NS	
1106 Blackhawk			NS		NS	NS			NS		NS				NS		NS			NS		NS	NS			NS		NS	NS			NS				NS		NS				NS		NS				NS		NS	
1204 Blackhawk (1)					NS	NS					NS						NS					NS	NS					NS	NS					0.6				NS								NS				NS	
1208 Blackhawk			NS		NS	NS			NS		NS				NS		NS			NS		NS	NS			NS		NS	NS			NS		0.9		NS		NS				NS		NS				NS		NS	
1212 Blackhawk			NS		NS	NS			NS		NS				NS		NS			NS		NS	NS			NS		NS	NS			NS		1		NS		NS				NS		NS				NS		NS	
1220 Blackhawk			NS		NS	NS			NS		NS				NS		NS			NS		NS	NS			NS		NS	NS			NS		2	5	NS		NS				NS		NS				NS		NS	
1310 Blackhawk			NS		NS	NS			NS		NS				NS		NS			NS		NS	NS			NS		NS	NS			NS		10	14	NS		NS				NS		NS				NS		NS	
1408 Blackhawk			NS		NS	NS			NS		NS				NS		NS			NS		NS	NS			NS		NS	NS			NS				NS		NS				NS		NS				NS		NS	
407 Dingman			NS		NS	NS			NS		NS				NS		NS			NS		NS	NS			NS		NS	NS			NS				NS		NS				NS		NS			0.9	NS		NS	
410 Kile			NS		NS	NS			NS		NS				NS		NS			NS		NS	NS			NS		NS	NS			NS		2	2	NS		NS				NS		NS			9	NS		NS	
416 Kile		0.9	NS		NS	NS			NS		NS				NS		NS			NS		NS	NS			NS		NS	NS			NS				NS		NS				NS		NS				NS		NS	
905 Watts			NS		NS	NS			NS		NS		0.9		NS		NS	0.5		NS		NS	NS			NS		NS	NS			NS		2	1	NS		NS				NS		NS				NS		NS	
909 Watts (1)					NS	NS					NS						NS	2	2			NS	NS					NS	NS					2	3			NS								NS				NS	
910 Watts (1)	19	15	15	2	NS						NS						NS	29	95	140	80	NS	19	0.5				NS		2	2			NS				NS								NS				NS	
914 Watts (1)	25	15	6.2	3	NS						NS						NS	86	68	110	56	NS						NS		3	2			NS				NS								NS				NS	
918 Watts	9	0.8	NS		NS	2			NS		NS				NS		NS	9	22	NS	4	NS	50			NS		NS		1		NS		NS			NS		NS				NS		NS				NS		NS	
1004 Watts	0.5		NS		NS	NS			NS		NS				NS		NS			NS		NS	NS			NS		NS	NS			NS				NS		NS				NS		NS				NS		NS	
1117 Watts	1		NS		NS	NS	0.6		NS		NS				NS		NS			NS		NS	NS	3		NS		NS	NS			NS				NS		NS				NS		NS				NS		NS	
1200 Watts		1	NS		NS	NS			NS		NS				NS		NS			NS		NS	NS			NS		NS	NS			NS				NS		NS				NS		NS				NS		NS	
1314 Watts	0.8		NS		NS	NS			NS		NS				NS		NS			NS		NS	NS	0.5		NS		NS	NS			NS				NS		NS				NS		NS				NS		NS	
407 Central (1)					NS	NS					NS						NS	1				NS	NS					NS	NS									NS								NS				NS	
900 N. Prairie			NS		NS	NS			NS		NS				NS		NS			NS		NS	NS			NS		NS	NS			NS				NS		NS				NS		NS		0.6		NS		NS	
330 E. Main	NS	NS	NS	NS		NS	NS	NS	NS	NS			NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS	
400 E. Main	NS	NS	NS	NS		NS	NS	NS	NS	NS			NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS	
450 E. Main	NS	NS	NS	NS		NS	NS	NS	NS	NS			NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS	
460 E. Main	NS	NS	NS	NS		NS	NS	NS	NS	NS			NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS	
500 E. Main	NS	NS	NS	NS		NS	NS	NS	NS	NS			NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS	
550 E. Main	NS	NS	NS	NS		NS	NS	NS	NS	NS			NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS	
Village Well No. 5	NS	NS	NS	NS		NS	NS	NS	NS	NS			NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS	

TABLE 4-18

Summary of Organic Compounds Detected in Private Wells
Remedial Investigation Report
Beloit Corporation - Blackhawk Facility
Rockton, Illinois

	1,1,1-Trichloroethane						1,1-Dichloroethane						Chloromethane						Tetrachloroethene						Trichloroethene						1,1-Dichloroethene						Chloroform						1,4-Dichlorobenzene						Methylene chloride						Dichlorodifluoromethane					
High School	NS	NS	NS	NS		NS	NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS		NS	NS	NS	NS	

Notes:

This table presents all volatile organic compounds detected during Phase I (1992) and Phase II (1994) and Removal Action (1996, 1997, and 1998) sampling at the Beloit Corporation - Blackhawk Facility NPL Site. The 1996 results are from June sampling, the 1997 results are from August sampling except for 914 Watts Ave. which was resampled in December. Only detections for the 1997 sampling are indicated, additional wells may have been sampled during this event. The 1998 results are from May sampling of private wells in the Village of Rockton which are located downgradient of the deep TCE plume south of Beloit Corporation property. The 02/1999 sampling was conducted by IEPA, only sample prior to carbon treatment unit is recorded.

1. NS - Not Sampled
2. All results are reported in ug/L. A blank indicates the compound was not detected at concentrations greater than the laboratory reporting limit.
3. All rounds are presented to allow comparison of results over time. Only those private wells and volatiles compounds detected in at least one sample are included here.

Footnotes:

(1) - indicates that the well was sampled during the Removal Action sampling event (June 1996).

APPENDIX B

TOXICOLOGY PROFILES FOR CHEMICALS OF POTENTIAL CONCERN

Toxicity profiles are presented for many of the chemical of potential concern (COPC) detected at the site. Noncancer type chemical effects associated with long-term exposure and the carcinogenic potential of the chemicals are summarized. Adverse chemical effects may be quite different depending upon the magnitude and duration of exposure. Therefore, the most applicable effects associated with exposure to the site would be due to low level and long-term exposure to the COPC.

The toxicity information contained in the profiles was obtained from one or more of the following sources:

- Patty's Industrial Hygiene and Toxicology
- Health Effects Assessment Summary Tables (1994)
- Casarett and Doull's Toxicology
- Integrated Risk Information System (IRIS)
- Health Effects Assessments Documents (HEA)

The following are summaries of health effects associated with exposure to the primary chemicals of potential concern at the site. The *primary* COPC were considered to be those that contributed greater than 25 percent of the risk associated with a particular medium, or were considered to be of potential concern based on qualitative considerations (i.e., inherent toxicity). Chemical specific profiles are provided for most primary chemicals of potential concern, but some chemicals which have similar toxicological effects are either addressed generically as a group, (e.g., chlorinated cyclodienes), or are represented by a specific COPC which represents the toxicology of the other chemicals in the group (e.g., noncarcinogenic polycyclic aromatic hydrocarbons [PAHs]).

SPECIAL NOTE TO THE READER

This toxicity information is provided for information purposes only, as required by the U.S. Environmental Protection Agency (U.S. EPA), as part of any BlRA performed under the Superfund Program. The toxic effects which are summarized in these toxicity profiles *do not* represent effects which would be anticipated to occur to persons exposed to the soil, surface water, sediment, or air, at the site.

ACETONE

Effects from Long-Term Exposure

Limited chronic toxicity data exists for acetone. Occupational exposure studies which have been conducted on inhalation exposure to acetone, revealed evidence of eye and nose irritation but there was no evidence of other toxic effects. No pertinent data regarding the teratogenic effects of acetone were identified in the literature. It has been found in animal studies that acetone can potentiate the effects of a number of chlorinated alkanes (e.g., carbon tetrachloride, and trichloroethane).

Carcinogenic Potential

There is no pertinent information available on the carcinogenicity of acetone in the literature, but acetone does not show mutagenic activity in microbial assay systems, cell transformation systems or appear to damage deoxyribnucleic acid (DNA).

ARSENIC

Noncancer Effects from Long-Term Exposure

Chronic worker exposure to arsenic compounds primarily affect the skin, mucous membranes, gastrointestinal tract, central nervous system and less commonly the liver and circulatory system.

There is some evidence from animal studies that implicates arsenic as a teratogen and reproductive toxicant. Mice exposed to arsenic as arsenate or arsenite during gestation had increased numbers of fetal reabsorptions, fetal deaths, and fetuses with exencephaly, and short jaws. The trivalent arsenite was much more toxic than then pentavalent arsenate at an equivalent arsenic dose.

Carcinogenic Potential

Arsenic compounds, particularly trivalent inorganics, have been associated with skin and lung carcinomas in humans. The U.S. EPA considers arsenic a Group A, human carcinogen.

BARIUM

Noncancer Effects from Long-Term Exposure

High barium concentrations in public drinking water supplies have been associated with elevated blood pressure in humans. Clinical studies to confirm this have not revealed any

toxicity, including increased blood pressure, at a dose level as high as 10 milligrams per day (mg/day).

Most animal studies that have been conducted have also detected no association between barium exposure and increased blood pressure. A single study with rats revealed increased blood pressure, but this was potentially attributable to other mineral deficiencies in the exposed rat population.

In occupational studies barium dust has been shown to cause baritosis. No symptoms of toxicity are evident other than workers have a significantly higher incidence of increased blood pressure.

Carcinogenic Potential

No appropriate information could be located in the available literature on the carcinogenic potential of barium in humans. Based on negative results in animal and mutation bioassays, barium does not appear to be a carcinogen. The metal is currently not classified by the U.S. EPA as a carcinogen (i.e., class D).

BENZENE

Noncancer Effects from Long-Term Exposure

Two general effects on the human blood system have been associated with chronic benzene exposure: cytotoxic blood disorders and carcinogenic blood disorders. The main organ that is affected is the bone marrow which produces red and white blood cell precursors. The cytotoxic blood disorders include a plastic anemia (a significant reduction in white blood cells, red blood cells and platelets) and cytogenetic changes in the nucleus of bone marrow cells and circulating lymphocytes.

Based on the available literature, there is no clear evidence that benzene is a reproductive toxicant after long-term exposure to low levels of the chemical. In animal studies, despite some maternal toxicity and embryonic resorption, no strong evidence of teratogenesis has been seen in animal studies.

Carcinogenic Potential

Data from studies of persons with known exposure to benzene indicate that benzene is a human carcinogen. Acute myeloblastic leukemia is a cancer of the blood cells, which has been associated with benzene exposure. Of note in human case reports is the long delay between the cessation of a known benzene exposure and the onset of leukemia. The U.S. EPA classifies benzene as a Group A, human carcinogen.

1,1-DICHLOROETHANE

Effects from Long-Term Exposure

Data on human toxicity associated with long-term exposure to 1,1-Dichloroethane (1,1,-DCA) could not be located in the available literature. The only long-term studies have been conducted with mice and rats. These studies indicate that the compound has a relatively low order of toxicity. Studies utilizing 2 to 3 gram oral doses found trends but not statistical differences in the mortality and weight gain of treated animals.

Data on the toxicity associated with long-term exposure to 1,1,-DCA via inhalation could not be located in the available literature. Teratogenic or reproductive effects have been found to occur in the rat, but only after inhalation of large doses of 1,1,-DCE. The NOEL for rats via inhalation was calculated to be 3,300 mg/kg/day. Other data on the teratogenic or reproductive effects of 1,1,-DCE could not be located in the available literature.

Carcinogenic Potential

1,1- DCA is classified as a B2- probable human carcinogen. The compound has been found to cause increases in tumors (both benign and cancerous) in rats and mice. The oral slope factor for the compound was developed based on increases in hemangiosarcoma in rats.

1,2-DICHLOROETHENES (cis or trans)

Noncancer Effects from Long-Term Exposure

Data on the effects of long-term, low level 1,2-Dichloroethenes (1,2-DCE) exposure to humans could not be located in the available literature.

Toxicological results from animal studies indicate that exposed animals exhibit loss of appetite, decreases in body weight and pathological changes in lung, liver, blood and kidneys at relatively high dose levels and over short periods of exposure. Effects associated with long-term exposure could not be located in the available literature.

The U.S. EPA selected studies on the health effects of rats and mice to estimate the risk of noncancer effects due to human exposures to cis and trans 1,2-DCE, respectively. Effects on blood were used as a measure of toxicity in the mouse, while changes in liver enzyme levels were used as a measure of toxicity in the rat.

No data on the potential for 1,2-DCE to be a reproductive toxicant in humans or animals could be identified.

Carcinogenic Potential

Data could not be located in the available literature to assess the carcinogenic potential of 1,2-DCE to humans or animals. Based on the chemicals low potential to produce mutations in a variety of in-vitro laboratory bioassays, it appears that this chemical may have a low potential to produce cancer. The U.S. EPA classifies this chemical as class D, a nonclassified chemical.

LEAD

Noncancer Effects From Long-Term Exposure

In general, the most sensitive system to long term lead exposure is the hematopoietic system. Lead inhibits two key enzymes in the heme synthesis pathway. At high levels, heme synthesis is depressed to the extent that anemia occurs. At high levels of chronic lead exposure, the nervous system, kidneys, and gastro-intestinal (GI) tract may also be affected.

Mental deterioration, hyperkinetic or aggressive behavior, sleeping disorders, vomiting have all been associated with chronic lead exposure. There is evidence that various types of neural dysfunction, resulting in permanent learning disabilities, can exist in apparently asymptomatic children. Decreased nerve conduction velocities have been documented in children and adults due to lead exposure. Children are especially sensitive to low-level exposure to lead.

There is little evidence that relatively high prenatal exposure to lead decreases the reproductive capability of women. Lead seems to have detrimental effects on the male reproductive system, however, producing gonadal impairment. Recently, there has been evidence indicating that lead has detrimental effects on the developing human fetus.

Carcinogenic Potential

Four epidemiology studies which have been conducted on occupational cohorts exposed to lead have not conclusively linked lead exposure with an increased incidence of cancer. Some studies have found a positive association between lead exposure and cancer while others have not. In general, the studies lack quantitative exposure information, and the sites of cancer (i.e., liver or kidney) are not consistent from study to study. The studies did not account for other known exposures to carcinogens (i.e. arsenic).

Although there is not sufficient evidence to causally link lead exposure and cancer in the human, a number of animal studies have shown associations between lead exposure and renal cancer. Lead is classified as a B2; probable human carcinogen.

Supporting data indicates that lead is mutagenic. Forms of lead have induced cell transformation in hamster embryo cells, as well as enhanced the incidence of simian adenovirus induction. Lead has been found to induce chromosomal aberrations both in-vivo and in-vitro.

MANGANESE

Noncancer Effects from Long-Term Exposure

Manganese is a essential trace nutrient in the human diet. The National Research Council (NRC) has determined a safe level of manganese ingestion to be 2-5 mg/day. Manganese ingested orally is one of the least toxic trace metals. At high concentrations in drinking water 14 to 28 mg/L, manganese can cause lethargy, increased muscle tone, tremors, and mental disturbances. The human body efficiently regulates manganese, therefore unless the dose of manganese becomes excessive, the body can regulate a constant blood serum concentration of manganese.

Inhalation exposure to manganese in the occupational environment has been associated with lung and central nervous system effects for decades. Such effects included pneumonia and mental disturbances.

Carcinogenic Potential

No appropriate information could be located in the available literature on the carcinogenic potential of manganese in humans. Based on negative results in animal studies and weak results in only a small proportion of the mutation bioassays reviewed, manganese does not appear to be a carcinogenic. The metal is currently not classified by the U.S. EPA as a carcinogen (i.e., class D).

NONCARCINOGENIC POLYNUCLEAR AROMATIC HYDROCARBONS

Limited toxicity information is available for the noncarcinogenic polynuclear aromatic hydrocarbons (PAHs) detected at the site. For this reason, the toxicity of the most studied, and generally most toxic, noncarcinogenic PAH (i.e., naphthalene) has been summarized. The following were the noncarcinogenic PAHs which were detected at the site:

- Phenathrene
- Fluoranthene

Effects From Long-Term Exposure

Little is known about the chronic health effects of naphthalene. Most of the chronic effects associated with naphthalene exposure have been documented in industry where exposures were high (but undocumented). The general effects from chronic xylene exposure to the ocular system have been corneal ulceration, and cataracts. Dermal exposure to xylene has caused erythema and dermatitis. Chronic inhalation of naphthalene vapors can cause

malaise, headache, and vomiting. There is not pertinent data on the teratogenicity of naphthalene. It is known that naphthalene is fetotoxic to infants causing hemolytic anemia. In the rabbit it causes retinal damage and cataracts.

Carcinogenic Potential

Naphthalene was not found to be genotoxic in vitro cell transformation assays with either rodent embryo cells, or murine mammary gland cells. Naphthalene was not found to be mutagenic in bacterial/microsomal assay systems. Based on a rat cancer bioassay conducted on naphthalene, oral ingestion of naphthalene did not result in an increased incidence of cancer. Based on the weight of evidence, the U.S. EPA has classified naphthalene as a noncarcinogen.

TRICHLOROETHENE

Effects from Long-Term Exposure

Human data relating long-term exposure to trichloroethene (TCE) to toxic end-points could not be located in the available literature. In laboratory studies conducted with rats, prolonged exposure to TCE results in histopathologic changes in the kidneys. Also observed were increased liver weight and loss of body weight in several laboratory species. Reduced fetal body weight, body size and delayed ossification have been reported in offspring following maternal exposure to TCE. In addition, results from a study performed in rabbits suggests an increased incidence of hydrocephalus.

Carcinogenic Potential

A weak mutagenic activity for TCE has been reported in bacterial systems in the presence of enzymatic activation. TCE has been demonstrated to produce multiple types of cancer in mice. At various times, the U.S. EPA has classified TCE as being a Group B2 carcinogen and as being on the C-B2 continuum (C = possible human carcinogen; B2 = probable human carcinogen). However, the U.S. EPA has withdrawn these classifications and has not adopted a current position.

TETRACHLOROETHENE

Effects from Long-Term Exposure

Potential adverse health effects resulting from prolonged exposure to tetrachloroethene (PCE) include changes in liver and kidney weight in laboratory animals. In addition, livers of treated animals exhibited histopathological changes. In some species, prolonged exposure to PCE caused reduced weight gain. PCE exposure to pregnant rats has resulted

in significantly increased incidences of subcutaneous edema, delayed ossification of skull bones and split sternebrae in offspring.

Carcinogenic Potential

PCE has demonstrated mutagenic activity in bacterial and mammalian cell bioassays. At various times, the U.S. EPA has classified PCE as being a Group C carcinogen, a Group B2 carcinogen, and as being on the C-B2 continuum (C = possible human carcinogen; B2 = probable human carcinogen). However, the U.S. EPA has withdrawn these classifications and has not adopted a current position.

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C

SHOWER SCENARIO BACK-UP

APPENDIX C

SHOWER INHALATION INTAKE CALCULATION

A screening method for estimating the indoor air concentrations from indoor water uses and the resulting human inhalation exposures, with an emphasis on showering, has been developed by the Office of Health and Environmental Assessment-Exposure Assessment Group, based on procedures developed by Julian Andelman at the University of Pittsburgh. The screening method, which presents in detail the methods used to estimate chemical exposure from showering, is included in this appendix. In the baseline risk assessment, the shower exposure equation is used in conjunction with the daily intake equation for inhalation of chemicals to calculate the average daily chemical intake associated with showering and grooming. This introduction summarizes how the two equations are incorporated.

Showering exposes a person to chemicals present in groundwater used for showering, through both dermal and inhalation exposure routes. The portion of the chemical in the water (Cw) that will volatilize is estimated to determine the chemical concentration in air (CA). The time spent in the shower, as well as time spent in the bathroom after the shower, are estimated and summed to determine the exposure time (ET). The breathing or inhalation rate (IR) is also estimated. These factors (i.e., CA, IR, and ET) are incorporated into both the shower exposure equation, presented below, and the daily intake equation presented in Table 5-2. The factors that average the daily exposure over the lifetime of an average receptor are included in the daily intake equation only. By integrating the two equations, the average daily chemical intake from the showering pathway was calculated.

The shower exposure equation estimates a person's chemical exposure in terms of mg of chemical per shower event, or mg/day:

$$Ei = \frac{\frac{(Cw*f*Fw*t_1)}{Va}}{2} (B*t_1) + \frac{(Cw*f*Fw*t_1)}{Va} * (B*t_2)$$

where:

Ei = Magnitude of chemical air exposure (mg/day)
Cw = Concentration of chemical in water (mg/L)
f = Fraction volatilized from water to air (assume 90% - Volatiles, 0% - Metals and Pesticides)
Fw = Flow rate of water from shower (600 L/hr)
t_1 = Shower time period (0.25 hr/day)
t_2 = Bathroom time period (i.e., after showering while grooming) (0.20 hr/day)
Va = Bathroom volume (10,000 L)
B = Person's inhalation rate (662.5 L/hr)

The shower exposure equation, with the inputs given above, can be reduced to the following:

$$Ei\ (mg/day) = Cw*f*4.06$$

The daily intake equation for inhalation of chemicals from air, presented in Table 5-2, is as follows:

$$I = \frac{CA*IR*ET*EF*ED}{BW*AT}$$

where:

I = Chemical intake due to inhalation exposure (mg/kg-day)
CA = Contaminant concentration in air (mg/m^3)
IR = Inhalation rate (L/hr which can be converted to m^3/day)
ET = Exposure time (hours/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Body weight (kg)
AT = Averaging time (days)

As described previously, the shower exposure question includes factors for exposure time (ET) and inhalation rate (IR). The chemical exposure per shower, calculated from the shower exposure equation, can be integrated into the daily intake equation to provide the average chemical exposure over the lifetime of the individual associated with showering and grooming. By including the constant derived by reducing the shower exposure equation, the factors common to both equations are:

$$Cw*f*4.06 = CA*IR*ET$$

The shower scenario is then integrated into the inhalation intake equation by substituting the one set of factors (Cw*f*4.06) for the other set of factors (CA*IR*ET), resulting in the following equation:

$$I = \frac{CA*f*4.06*EF*ED}{BW*AT}$$

This equation was used to calculate the daily intakes associated with showering and grooming in the baseline risk assessment.

It should be noted, that when calculating the daily intake for dermal chemical exposure resulting from showering, the concentration in water was decreased due to volatilization. The chemical concentration in water was scaled downward by the fraction not volatilized: 0.10 for volatiles, and 1.00 for pesticides and metals when calculating dermal intakes during showering.

References:

Andelman, J.B. 1985. *Human Exposures to Volatile Halogenated Organic Chemicals in Indoor and Outdoor Air.* Environmental Health Perspective 62:313-318.

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D

CHEMICAL-SPECIFIC HEALTH RISK ESTIMATES

Table D-1

EXPOSURE AND HEALTH RISK ESTIMATES
Maximum Reasonable Exposure

Beloit Corporation Remedial Investigation
Rockton, Illinois

Source Area: Groundwater
Medium: Groundwater On Beloit Corporation Property

Population: Hypothetical Residents (see note 1 below)
Land Use: Hypothetical Future Land Use Scenario

CHEMICAL OF POTENTIAL CONCERN	EPC (mg/L)	*Chronic Daily Intake Values*						Noncancer Hazard Quotients					Cancer Risks				
		Noncarcinogenic			Carcinogenic			Dermal				% of	Dermal				% of
		Dermal	Ingestion	Inhalation	Dermal	Ingestion	Inhalation	Contact	Ingestion	Inhalation	Total	Total	Contact	Ingestion	Inhalation	Total	Total
VOLATILES																	
Chloromethane	8.1E-02	1.1E-05	2.6E-03	8.7E-03	4.8E-06	1.1E-03	3.7E-03	ND	ND	1.0E-01	1.0E-01	0.2	6.2E-08	1.5E-05	2.4E-05	3.8E-05	0.5
Carbon disulfide	2.0E-03	1.8E-06	6.5E-05	2.2E-04	7.7E-07	2.8E-05	9.2E-05	1.8E-05	6.5E-04	1.1E-03	1.7E-03	0.0	ND	ND	ND	ND	0.0
1,1-Dichloroethene	2.6E-02	1.6E-05	8.5E-04	2.8E-03	6.7E-06	3.6E-04	1.2E-03	1.7E-03	9.4E-02	ND	9.6E-02	0.2	4.0E-06	2.2E-04	1.4E-03	1.7E-03	22.7
1,1-Dichloroethane	1.5E-02	4.8E-06	4.9E-04	1.6E-03	2.0E-06	2.1E-04	6.9E-04	4.8E-05	4.9E-03	1.1E-02	1.6E-02	0.0	ND	ND	ND	ND	0.0
1,2-Dichloroethene (cis)	4.8E-01	1.8E-04	1.6E-02	5.2E-02	7.6E-05	6.7E-03	2.2E-02	1.8E-02	1.6E+00	ND	1.6E+00	3.2	ND	ND	ND	ND	0.0
1,2-Dichloroethane	3.2E-01	6.0E-05	1.0E-02	3.4E-02	2.6E-05	4.5E-03	1.5E-02	2.0E-03	3.5E-01	2.5E+01	2.5E+01	50.5	2.3E-06	4.1E-04	1.3E-03	1.8E-03	24.0
1,1,1-Trichloroethane	1.6E-01	1.0E-04	5.2E-03	1.7E-02	4.4E-05	2.2E-03	7.4E-03	5.1E-03	2.6E-01	6.0E-02	3.3E-01	0.7	ND	ND	ND	ND	0.0
Carbon tetrachloride	3.0E-03	0.0E+00	9.8E-05	3.2E-04	0.0E+00	4.2E-05	1.4E-04	ND	1.4E-01	5.7E-01	7.1E-01	1.4	ND	5.4E-06	7.3E-06	1.3E-05	0.2
Trichloroethene	1.6E-01	9.6E-05	5.2E-03	1.7E-02	4.1E-05	2.2E-03	7.4E-03	1.6E-02	8.7E-01	ND	8.8E-01	1.8	4.5E-07	2.5E-05	4.4E-05	6.9E-05	0.9
Tetrachloroethene	4.3E+00	8.5E-03	1.4E-01	4.6E-01	3.7E-03	6.0E-02	2.0E-01	8.5E-01	1.4E+01	3.3E+00	1.8E+01	36.7	1.9E-04	3.1E-03	4.0E-04	3.7E-03	50.6
SEMIVOLATILES																	
Phenol	2.0E-03	3.9E-07	6.5E-05	2.2E-04	1.7E-07	2.8E-05	9.2E-05	6.5E-07	1.1E-04	ND	1.1E-04	0.0	ND	ND	ND	ND	0.0
Dimethylphthalate	1.0E-03	0.0E+00	3.3E-05	1.1E-04	0.0E+00	1.4E-05	4.6E-05	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0
Diethylphthalate	2.0E-03	3.7E-07	6.5E-05	2.2E-04	1.6E-07	2.8E-05	9.2E-05	4.7E-07	8.1E-05	ND	8.2E-05	0.0	ND	ND	ND	ND	0.0
Di-n-butylphthalate	1.0E-03	1.5E-06	3.3E-05	1.1E-04	6.2E-07	1.4E-05	4.6E-05	1.5E-05	3.3E-04	ND	3.4E-04	0.0	ND	ND	ND	ND	0.0
PESTICIDE/PCB																	
Heptachlor	1.6E-04	0.0E+00	5.2E-06	8.6E-06	0.0E+00	2.2E-06	3.7E-06	ND	1.0E-02	ND	1.0E-02	0.0	ND	1.0E-05	1.7E-05	2.7E-05	0.4
Endrin Aldehyde	5.0E-06	3.0E-09	1.6E-07	2.7E-07	1.3E-09	7.0E-08	1.2E-07	1.0E-05	5.4E-04	ND	5.5E-04	0.0	ND	ND	ND	ND	0.0
METALS																	
Aluminum	1.3E-01	9.4E-06	4.1E-03	0.0E+00	4.0E-06	1.8E-03	0.0E+00	9.4E-05	4.1E-03	ND	4.2E-03	0.0	ND	ND	ND	ND	0.0
Arsenic	2.5E-03	1.9E-07	8.1E-05	0.0E+00	8.0E-08	3.5E-05	0.0E+00	6.2E-04	2.7E-01	ND	2.7E-01	0.5	1.2E-07	5.2E-05	ND	5.2E-05	0.7
Barium	2.3E-01	1.7E-05	7.4E-03	0.0E+00	7.3E-06	3.2E-03	0.0E+00	3.5E-03	1.1E-01	ND	1.1E-01	0.2	ND	ND	ND	ND	0.0
Cadmium (water)	5.8E-03	4.3E-07	1.9E-04	0.0E+00	1.9E-07	8.1E-05	0.0E+00	3.5E-02	3.8E-01	ND	4.1E-01	0.8	ND	ND	ND	ND	0.0
Chromium VI	1.5E-02	1.1E-06	4.9E-04	0.0E+00	4.8E-07	2.1E-04	0.0E+00	1.5E-02	1.6E-01	ND	1.8E-01	0.4	ND	ND	ND	ND	0.0
Cobalt	4.9E-03	1.5E-07	1.6E-04	0.0E+00	6.3E-08	6.8E-05	0.0E+00	2.4E-06	2.7E-03	ND	2.7E-03	0.0	ND	ND	ND	ND	0.0
Copper	1.5E-02	1.1E-06	4.9E-04	0.0E+00	4.8E-07	2.1E-04	0.0E+00	1.0E-04	1.3E-02	ND	1.3E-02	0.0	ND	ND	ND	ND	0.0
Lead	3.4E-03	1.0E-09	1.1E-04	0.0E+00	4.4E-10	4.7E-05	0.0E+00	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0
Manganese	3.7E-01	2.7E-05	1.2E-02	0.0E+00	1.2E-05	5.1E-03	0.0E+00	4.9E-03	8.5E-02	ND	9.0E-02	0.2	ND	ND	ND	ND	0.0

Table D-1

EXPOSURE AND HEALTH RISK ESTIMATES
Maximum Reasonable Exposure

Beloit Corporation Remedial Investigation
Rockton, Illinois

Source Area: Groundwater
Medium: Groundwater On Beloit Corporation Property

Population: Hypothetical Residents (see note 1 below)
Land Use: Hypothetical Future Land Use Scenario

CHEMICAL OF POTENTIAL CONCERN	EPC (mg/L)	Chronic Daily Intake Values						Noncancer Hazard Quotients					Cancer Risks				
		Noncarcinogenic			Carcinogenic			Dermal Contact	Ingestion	Inhalation	Total	% of Total	Dermal Contact	Ingestion	Inhalation	Total	% of Total
		Dermal	Ingestion	Inhalation	Dermal	Ingestion	Inhalation										
Mercury	3.2E-04	2.4E-08	1.0E-05	0.0E+00	1.0E-08	4.5E-06	0.0E+00	8.0E-05	3.5E-02	ND	3.5E-02	0.1	ND	ND	ND	ND	0.0
Nickel	8.8E-01	6.6E-06	2.9E-02	0.0E+00	2.8E-06	1.2E-02	0.0E+00	8.2E-03	1.4E+00	ND	1.4E+00	2.9	ND	ND	ND	ND	0.0
Selenium	1.1E-02	8.2E-07	3.6E-04	0.0E+00	3.5E-07	1.5E-04	0.0E+00	1.6E-04	7.2E-02	ND	7.2E-02	0.1	ND	ND	ND	ND	0.0
Zinc	4.7E-02	2.1E-06	1.5E-03	0.0E+00	9.0E-07	6.5E-04	0.0E+00	7.0E-06	5.1E-03	ND	5.1E-03	0.0	ND	ND	ND	ND	0.0
Cyanide	9.0E-03	6.7E-07	2.9E-04	0.0E+00	2.9E-07	1.3E-04	0.0E+00	3.4E-05	1.5E-02	ND	1.5E-02	0.0	ND	ND	ND	ND	0.0
						Total Risks:		9.6E-01	2.0E+01	2.9E+01	4.9E+01	100.0	2.0E-04	3.8E-03	3.3E-03	7.3E-03	100.0

Notes:

1. This table summarizes the potential risks for hypothetical residences if groundwater from the shallow aquifer on the Beloit Corporation property was used as a drinking water source. This is provided for informational purposes, because such a scenario is considered highly unlikely. It was assumed for purposes of this scenario that hypothetical residents will consume on a daily basis all of their drinking water from the most contaminated portion of the shallow aquifer on the Beloit Corporation Property for thirty (30) years, and the concentration of the chemicals in the groundwater was assumed to be equivalent to the maximum concentrations detected in the monitoring wells on site during the RI period.
2. Adsorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.
3. For noncarcinogenic effects, the chronic daily intake (CDI) is averaged over the exposure period; whereas for carcinogenic effects, the CDI is averaged over the lifetime (i.e., 70 years). Therefore, the difference between the CDI for noncarcinogenic vs. carcinogenic effects is due to the different methods of time weighting used to estimate the value.
4. A noncancer risk estimate (HQ) of greater than 1 indicates the potential of noncancer effects (e.g., liver disease) to occur in humans exposed at an assumed level and duration to a contaminated medium. A cancer risk level of greater than 1.0e-04 (i.e., one in ten thousand) is above the U.S.EPA's protective risk range for Superfund Sites.
5. Hazard quotient and cancer risks are unitless values which represent the probability of incurring an adverse health effect. These risk values are calculated using the following relationships:
   Hazard Quotient = Chronic Daily Intake / Reference Dose
   Cancer Risk = Chronic Daily Intake x Slope Factor
6. Hazard Quotients and cancer risks are summarized for applicable routes of exposure. Values for each route are summed to arrive at a total exposure pathway risk. The percentage of total risk is also shown for each compound. In some cases, risks were not determined (ND) because a reference dose or slope factor was not available. NA indicates the route is not applicable.

Legend:
EPC = Exposure Point Concentration

Table D-2

EXPOSURE AND HEALTH RISK ESTIMATES
Maximum Reasonable Exposure

Beloit Corporation Remedial Investigation
Rockton, Illinois

Source Area: Groundwater
Medium: Private wells with no point of use treatment system (Hypothetical)

Population: Specific Southern Blackhawk Residents (see note 1 below)
Land Use: Current Use Scenario

CHEMICAL OF POTENTIAL CONCERN	EPC (mg/L)	Chronic Daily Intake Values						Noncancer Hazard Quotients					Cancer Risks				
		Noncarcinogenic			Carcinogenic			Dermal Contact	Ingestion	Inhalation	Total	% of Total	Dermal Contact	Ingestion	Inhalation	Total	% of Total
		Dermal	Ingestion	Inhalation	Dermal	Ingestion	Inhalation										
VOLATILES																	
1,1-Dichloroethene	1.8E-03	1.1E-06	5.9E-05	1.9E-04	4.6E-07	2.5E-05	8.3E-05	1.2E-04	6.5E-03	ND	6.6E-03	2.7	2.8E-07	1.5E-05	1.0E-04	1.1E-04	73.0
1,1,1-Trichloroethane	1.6E-02	1.0E-05	5.3E-04	1.8E-03	4.4E-06	2.3E-04	7.5E-04	5.2E-04	2.6E-02	6.1E-03	3.3E-02	13.3	ND	ND	ND	ND	0.0
Tetrachloroethene	5.0E-02	9.8E-05	1.6E-03	5.3E-03	4.2E-05	6.9E-04	2.3E-03	9.8E-03	1.6E-01	3.8E-02	2.1E-01	84.0	2.2E-06	3.6E-05	4.6E-06	4.3E-05	27.0
						Total Risks:		1.0E-02	1.9E-01	4.4E-02	2.5E-01	100.0	2.5E-06	5.1E-05	1.0E-04	1.6E-04	100.0

Notes:

1. This table applies only to residents in the Southern Blackhawk Acres Subdivision area that have had point of use treatment systems installed by the IEPA. This table summarizes the hypothetical risks a Southern Blackhawk Acres Subdivision area resident would incur if no point-of-use groundwater treatment system had been installed. It was assumed for purposes of this hypothetical scenario that a resident in this area consumed on a daily basis all of their drinking water from their private well for thirty (30) years, and the concentration of each chemical in the groundwater was assumed to be equivalent to the average concentration in the private well where the maximum concentration of each chemical was detected.
2. Adsorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.
3. For noncarcinogenic effects, the chronic daily intake (CDI) is averaged over the exposure period; whereas for carcinogenic effects, the CDI is averaged over the lifetime (i.e., 70 years). Therefore, the difference between the CDI for noncarcinogenic vs. carcinogenic effects is due to the different methods of time weighting used to estimate the value.
4. A noncancer risk estimate (HQ) of greater than 1 indicates the potential of noncancer effects (e.g., liver disease) to occur in humans exposed at an assumed level and duration to a contaminated medium. A cancer risk level of greater than 1.0e-04 (i.e., one in ten thousand) is above the U.S.EPA's protective risk range for Superfund Sites.
5. Hazard quotient and cancer risks are unitless values which represent the probability of incurring an adverse health effect. These risk values are calculated using the following relationships:
   Hazard Quotient = Chronic Daily Intake / Reference Dose
   Cancer Risk = Chronic Daily Intake x Slope Factor
6. Hazard Quotients and cancer risks are summarized for applicable routes of exposure. Values for each route are summed to arrive at a total exposure pathway risk. The percentage of total risk is also shown for each compound. In some cases, risks were not determined (ND) because a reference dose or slope factor was not available. NA indicates the route is not applicable.

Legend:
EPC = Exposure Point Concentration

Table D-3

EXPOSURE AND HEALTH RISK ESTIMATES
Maximum Reasonable Exposure

Beloit Corporation Remedial Investigation
Rockton, Illinois

Source Area: Groundwater
Medium: Private wells with no point of use treatment system (Hypothetical)

Population: Specific Eastern Blackhawk Residents (see note 1 below)
Land Use: Current Use Scenario

CHEMICAL OF POTENTIAL CONCERN	EPC (mg/L)	Chronic Daily Intake Values: Noncarcinogenic Dermal	Noncarcinogenic Ingestion	Noncarcinogenic Inhalation	Carcinogenic Dermal	Carcinogenic Ingestion	Carcinogenic Inhalation	Noncancer Hazard Quotients: Dermal Contact	Ingestion	Inhalation	Total	% of Total	Cancer Risks: Dermal Contact	Ingestion	Inhalation	Total	% of Total
VOLATILES																	
1,1-Dichloroethane	1.8E-03	5.7E-07	5.9E-05	1.9E-04	2.5E-07	2.5E-05	8.3E-05	5.7E-06	5.9E-04	1.4E-03	1.9E-03	2.3	ND	ND	ND	ND	0.0
1,1,1-Trichloroethane	8.0E-03	5.1E-06	2.6E-04	8.6E-04	2.2E-06	1.1E-04	3.7E-04	2.5E-04	1.3E-02	3.0E-03	1.6E-02	19.4	ND	ND	ND	ND	0.0
Trichloroethene	1.2E-02	7.1E-06	3.9E-04	1.3E-03	3.1E-06	1.7E-04	5.5E-04	1.2E-03	6.4E-02	ND	6.6E-02	78.3	3.4E-08	1.8E-06	3.3E-06	5.2E-06	100.0
					Total Risks:			1.4E-03	7.8E-02	4.4E-03	8.4E-02	100.0	3.4E-08	1.8E-06	3.3E-06	5.2E-06	100.0

Notes:

1. This table applies only to residents in the Eastern Blackhawk Acres Subdivision area that have had point of use treatment systems installed by the IEPA. This table summarizes the hypothetical risks a Eastern Blackhawk Acres Subdivision area resident would incur if no point-of-use groundwater treatment system had been installed. It was assumed for purposes of this hypothetical scenario that a resident in this area consumed on a daily basis all of their drinking water from their private well for thirty (30) years, and the concentration of each chemical in the groundwater was assumed to be equivalent to the average concentration in the private well where the maximum concentration of each chemical was detected.
2. Adsorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.
3. For noncarcinogenic effects, the chronic daily intake (CDI) is averaged over the exposure period; whereas for carcinogenic effects, the CDI is averaged over the lifetime (i.e., 70 years). Therefore, the difference between the CDI for noncarcinogenic vs. carcinogenic effects is due to the different methods of time weighting used to estimate the value.
4. A noncancer risk estimate (HQ) of greater than 1 indicates the potential of noncancer effects (e.g., liver disease) to occur in humans exposed at an assumed level and duration to a contaminated medium. A cancer risk level of greater than 1.0e-04 (i.e., one in ten thousand) is above the U.S.EPA's protective risk range for Superfund Sites.
5. Hazard quotient and cancer risks are unitless values which represent the probability of incurring an adverse health effect. These risk values are calculated using the following relationships:
   Hazard Quotient = Chronic Daily Intake / Reference Dose
   Cancer Risk = Chronic Daily Intake x Slope Factor
6. Hazard Quotients and cancer risks are summarized for applicable routes of exposure. Values for each route are summed to arrive at a total exposure pathway risk. The percentage of total risk is also shown for each compound. In some cases, risks were not determined (ND) because a reference dose or slope factor was not available. NA indicates the route is not applicable.

Legend:
EPC = Exposure Point Concentration

Table D-4

EXPOSURE AND HEALTH RISK ESTIMATES
Maximum Reasonable Exposure

Beloit Corporation Remedial Investigation
Rockton, Illinois

Source Area: Groundwater
Medium: Private wells with no point of use treatment system

Population: Specific Northern Blackhawk Residents (see note 1 below)
Land Use: Current Use Scenario

CHEMICAL OF POTENTIAL CONCERN	EPC (mg/L)	Chronic Daily Intake Values						Noncancer Hazard Quotients					Cancer Risks				
		Noncarcinogenic			Carcinogenic			Dermal Contact	Ingestion	Inhalation	Total	% of Total	Dermal Contact	Ingestion	Inhalation	Total	% of Total
		Dermal	Ingestion	Inhalation	Dermal	Ingestion	Inhalation										
VOLATILES																	
Chloroform	1.2E-02	4.0E-06	3.9E-04	1.3E-03	1.7E-06	1.7E-04	5.5E-04	4.0E-04	3.9E-02	1.3E-01	1.7E-01	100.0	1.0E-08	1.0E-06	4.5E-05	4.6E-05	100.0
						Total Risks:		4.0E-04	3.9E-02	1.3E-01	1.7E-01	100.0	1.0E-08	1.0E-06	4.5E-05	4.6E-05	100.0

Notes:

1. This table summarizes the potential risks for the residences in the Northern Blackhawk Acres Subdivision that do not have point-of-use groundwater treatment systems, and have chloroform affected groundwater. It was assumed for purposes of this scenario that a resident consumed on a daily basis all of their drinking water from their private well in the Northern Blackhawk Subdivision area for thirty (30) years, and the concentration of chloroform in the groundwater was assumed to be equivalent to the average concentration in the private well where the maximum concentration of chloroform was detected.
2. Adsorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.
3. For noncarcinogenic effects, the chronic daily intake (CDI) is averaged over the exposure period; whereas for carcinogenic effects, the CDI is averaged over the lifetime (i.e., 70 years). Therefore, the difference between the CDI for noncarcinogenic vs. carcinogenic effects is due to the different methods of time weighting used to estimate the value.
4. A noncancer risk estimate (HQ) of greater than 1 indicates the potential of noncancer effects (e.g., liver disease) to occur in humans exposed at an assumed level and duration to a contaminated medium. A cancer risk level of greater than 1.0e-04 (i.e., one in ten thousand) is above the U.S.EPA's protective risk range for Superfund Sites.
5. Hazard quotient and cancer risks are unitless values which represent the probability of incurring an adverse health effect. These risk values are calculated using the following relationships:
   Hazard Quotient = Chronic Daily Intake / Reference Dose
   Cancer Risk = Chronic Daily Intake x Slope Factor
6. Hazard Quotients and cancer risks are summarized for applicable routes of exposure. Values for each route are summed to arrive at a total exposure pathway risk. The percentage of total risk is also shown for each compound. In some cases, risks were not determined (ND) because a reference dose or slope factor was not available. NA indicates the route is not applicable.

Legend:
EPC = Exposure Point Concentration

Table D-5

EXPOSURE AND HEALTH RISK ESTIMATES
Maximum Reasonable Exposure

Beloit Corporation Remedial Investigation
Rockton, Illinois

Source Area: Groundwater
Medium: *Other private wells with no point of use treatment systems*

Population: Specific Blackhawk Residents (see note 1 below)
Land Use: Current Use Scenario

CHEMICAL OF POTENTIAL CONCERN	EPC (mg/L)	Chronic Daily Intake Values: Noncarcinogenic Dermal	Noncarcinogenic Ingestion	Noncarcinogenic Inhalation	Carcinogenic Dermal	Carcinogenic Ingestion	Carcinogenic Inhalation	Noncancer Hazard Quotients: Dermal Contact	Ingestion	Inhalation	Total	% of Total	Cancer Risks: Dermal Contact	Ingestion	Inhalation	Total	% of Total
VOLATILES																	
Chloromethane	9.0E-04	1.2E-07	2.9E-05	9.7E-05	5.3E-08	1.3E-05	4.2E-05	ND	ND	1.1E-03	1.1E-03	1.5	6.9E-10	1.6E-07	2.6E-07	4.3E-07	6.4
Methylene chloride	5.0E-04	7.7E-08	1.6E-05	5.4E-05	3.3E-08	7.0E-06	2.3E-05	1.6E-06	2.7E-04	6.3E-05	3.4E-04	0.4	3.1E-10	5.2E-08	3.7E-08	8.9E-08	1.3
1,1-Dichloroethane	7.0E-04	2.2E-07	2.3E-05	7.5E-05	9.5E-08	9.8E-06	3.2E-05	2.2E-06	2.3E-04	5.3E-04	7.6E-04	1.0	ND	ND	ND	ND	0.0
1,1,1-Trichloroethane	2.0E-03	1.3E-06	6.5E-05	2.2E-04	5.4E-07	2.8E-05	9.2E-05	6.4E-05	3.3E-03	7.5E-04	4.1E-03	5.4	ND	ND	ND	ND	0.0
Trichloroethene	4.0E-03	2.4E-06	1.3E-04	4.3E-04	1.0E-06	5.6E-05	1.8E-04	4.0E-04	2.2E-02	ND	2.2E-02	29.1	1.1E-08	6.1E-07	1.1E-06	1.7E-06	25.9
Tetrachloroethene	4.2E-03	8.3E-06	1.4E-04	4.5E-04	3.6E-06	5.9E-05	1.9E-04	8.3E-04	1.4E-02	3.2E-03	1.8E-02	23.4	1.9E-07	3.0E-06	3.9E-07	3.6E-06	54.1
Dichlorodifluoromethane	1.4E-02	6.3E-06	4.6E-04	1.5E-03	2.7E-06	2.0E-04	6.5E-04	3.1E-05	2.3E-03	2.6E-02	2.9E-02	37.9	ND	ND	ND	ND	0.0
1,4-Dichlorobenzene	6.0E-04	1.5E-06	2.0E-05	6.5E-05	6.4E-07	8.4E-06	2.8E-05	5.0E-05	6.5E-04	2.8E-04	9.8E-04	1.3	1.5E-08	2.0E-07	6.1E-07	8.3E-07	12.3
						Total Risks:		1.4E-03	4.2E-02	3.2E-02	7.6E-02	100.0	2.1E-07	4.1E-06	2.4E-06	6.7E-06	100.0

Notes:

1. This table summarizes the potential risks for the other residences in the Blackhawk Acres Subdivision that do not have point-of-use groundwater treatment systems. It was assumed for purposes of this scenario that a resident consumed on a daily basis all of their drinking water from their private well in the Blackhawk Subdivision for thirty (30) years, and the concentration of the chemical in the groundwater was assumed to be equivalent to the maximum concentration detected in any of the other private wells not having a point of use treatment system. Note that chloroform affected wells have been handled separately (refer to Table D-4).
2. Adsorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.
3. For noncarcinogenic effects, the chronic daily intake (CDI) is averaged over the exposure period; whereas for carcinogenic effects, the CDI is averaged over the lifetime (i.e., 70 years). Therefore, the difference between the CDI for noncarcinogenic vs. carcinogenic effects is due to the different methods of time weighting used to estimate the value.
4. A noncancer risk estimate (HQ) of greater than 1 indicates the potential of noncancer effects (e.g., liver disease) to occur in humans exposed at an assumed level and duration to a contaminated medium. A cancer risk level of greater than 1.0e-04 (i.e., one in ten thousand) is above the U.S.EPA's protective risk range for Superfund Sites.
5. Hazard quotient and cancer risks are unitless values which represent the probability of incurring an adverse health effect. These risk values are calculated using the following relationships:
   Hazard Quotient = Chronic Daily Intake / Reference Dose
   Cancer Risk = Chronic Daily Intake x Slope Factor
6. Hazard Quotients and cancer risks are summarized for applicable routes of exposure. Values for each route are summed to arrive at a total exposure pathway risk. The percentage of total risk is also shown for each compound. In some cases, risks were not determined (ND) because a reference dose or slope factor was not available. NA indicates the route is not applicable.

Legend:
EPC = Exposure Point Concentration

Table D-6

EXPOSURE AND HEALTH RISK ESTIMATES
Reasonable Maximum Exposure

Beloit Corporation Remedial Investigation
Rockton, Illinois

Source Area: Groundwater
Medium: Rock River Surface Water

Population: Rock River Recreational User
Land Use: Current Use Scenario

CHEMICAL OF POTENTIAL CONCERN	EPC (mg/L)	Chronic Daily Intake Values						Noncancer Hazard Quotients					Cancer Risks				
		Noncarcinogenic			Carcinogenic			Dermal Contact	Ingestion	Inhalation	Total	% of Total	Dermal Contact	Ingestion	Inhalation	Total	% of Total
		Dermal	Ingestion	Inhalation	Dermal	Ingestion	Inhalation										
VOLATILES																	
1,1-Dichloroethene	1.2E-06	1.2E-09	2.9E-10	NA	1.7E-10	4.1E-11	NA	1.3E-07	3.2E-08	NA	1.6E-07	7.5	1.0E-10	2.5E-11	NA	1.3E-10	78.3
1,1-Dichloroethane	7.0E-07	3.7E-10	1.7E-10	NA	5.2E-11	2.4E-11	NA	3.7E-09	1.7E-09	NA	5.3E-09	0.2	ND	ND	NA	ND	0.0
1,2-Dichloroethene (cis)	1.0E-07	6.1E-11	2.4E-11	NA	8.7E-12	3.4E-12	NA	6.1E-09	2.4E-09	NA	8.5E-09	0.4	ND	ND	NA	ND	0.0
1,1,1-Trichloroethane	7.1E-06	7.4E-09	1.7E-09	NA	1.1E-09	2.4E-10	NA	3.7E-07	8.5E-08	NA	4.6E-07	21.0	ND	ND	NA	ND	0.0
Trichloroethene	6.0E-06	5.9E-09	1.4E-09	NA	8.4E-10	2.1E-10	NA	9.8E-07	2.4E-07	NA	1.2E-06	56.3	9.3E-12	2.3E-12	NA	1.2E-11	7.2
Tetrachloroethene	9.0E-07	2.9E-09	2.2E-10	NA	4.2E-10	3.1E-11	NA	2.9E-07	2.2E-08	NA	3.1E-07	14.5	2.2E-11	1.6E-12	NA	2.3E-11	14.5
						Total Risks:		1.8E-06	3.8E-07	0.0E+00	2.2E-06	100.0	1.3E-10	2.9E-11	0.0E+00	1.6E-10	100.0

Notes:

1. Adsorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.
2. For noncarcinogenic effects, the chronic daily intake (CDI) is averaged over the exposure period; whereas for carcinogenic effects, the CDI is averaged over the lifetime (i.e., 70 years). Therefore, the difference between the CDI for noncarcinogenic vs. carcinogenic effects is due to the different methods of time weighting used to estimate the value.
3. A noncancer risk estimate (HQ) of greater than 1 indicates the potential of noncancer effects (e.g., liver disease) to occur in humans exposed at an assumed level and duration to a contaminated medium. A cancer risk level of greater than 1.0e-04 (i.e., one in ten thousand) is above the U.S.EPA's protective risk range for Superfund Sites.
4. Hazard quotient and cancer risks are unitless values which represent the probability of incurring an adverse health effect. These risk values are calculated using the following relationships:
   Hazard Quotient = Chronic Daily Intake / Reference Dose
   Cancer Risk = Chronic Daily Intake x Slope Factor
5. Hazard Quotients and cancer risks are summarized for applicable routes of exposure. Values for each route are summed to arrive at a total exposure pathway risk. The percentage of total risk is also shown for each compound. In some cases, risks were not determined (ND) because a reference dose or slope factor was not available. NA indicates the route is not applicable.

Legend:
EPC = Exposure Point Concentration

Table D-7

EXPOSURE AND HEALTH RISK ESTIMATES
Reasonable Maximum Exposure

Beloit Corporation Remedial Investigation
Rockton, Illinois

Source Area: Rock River
Medium: Sediment

Population: Hypothetical Recreational Users
Land Use: Current Use Scenario

CHEMICAL OF POTENTIAL CONCERN	EPC (mg/kg)	Chronic Daily Intake Values						Noncancer Hazard Quotients					Cancer Risks				
		Noncarcinogenic			Carcinogenic			Dermal Contact	Ingestion	Inhalation	Total	% of Total	Dermal Contact	Ingestion	Inhalation	Total	% of Total
		Dermal	Ingestion	Inhalation	Dermal	Ingestion	Inhalation										
VOLATILES																	
Acetone	1.6E-01	3.6E-06	7.7E-08	NA	5.2E-07	1.1E-08	NA	3.6E-05	7.7E-07	NA	3.7E-05	0.0	ND	ND	NA	ND	0.0
2-Butanone	3.6E-02	8.1E-07	1.7E-08	NA	1.2E-07	2.5E-09	NA	1.4E-06	2.9E-08	NA	1.4E-06	0.0	ND	ND	NA	ND	0.0
Ethylbenzene	1.5E-01	1.0E-07	7.2E-08	NA	1.4E-08	1.0E-08	NA	1.0E-06	7.2E-07	NA	1.7E-06	0.0	ND	ND	NA	ND	0.0
Xylenes (mixed)	1.1E-01	7.4E-08	5.3E-08	NA	1.1E-08	7.5E-09	NA	3.7E-08	2.6E-08	NA	6.4E-08	0.0	ND	ND	NA	ND	0.0
SEMIVOLATILES																	
Acenaphthylene	1.4E-01	0.0E+00	6.7E-08	NA	0.0E+00	9.6E-09	NA	ND	ND	NA	ND	0.0	ND	ND	NA	ND	0.0
Fluorene	4.6E-02	0.0E+00	2.2E-08	NA	0.0E+00	3.2E-09	NA	5.5E-07	5.5E-07	NA	1.1E-06	0.0	ND	ND	NA	ND	0.0
Phenanthrene	2.8E-01	0.0E+00	1.3E-07	NA	0.0E+00	1.9E-08	NA	ND	ND	NA	ND	0.0	ND	ND	NA	ND	0.0
Anthracene	2.3E-01	0.0E+00	1.1E-07	NA	0.0E+00	1.6E-08	NA	3.7E-07	3.7E-07	NA	7.4E-07	0.0	ND	ND	NA	ND	0.0
Fluoranthene	8.4E-01	0.0E+00	4.0E-07	NA	0.0E+00	5.8E-08	NA	1.0E-05	1.0E-05	NA	2.0E-05	0.0	ND	ND	NA	ND	0.0
Pyrene	1.1E+00	0.0E+00	5.3E-07	NA	0.0E+00	7.5E-08	NA	1.8E-05	1.8E-05	NA	3.5E-05	0.0	ND	ND	NA	ND	0.0
Benzo(a)anthracene	5.0E-01	0.0E+00	2.4E-07	NA	0.0E+00	3.4E-08	NA	ND	ND	NA	ND	0.0	2.5E-08	2.5E-08	NA	5.0E-08	2.9
Chrysene	4.9E-01	0.0E+00	2.3E-07	NA	0.0E+00	3.4E-08	NA	ND	ND	NA	ND	0.0	2.5E-10	2.5E-10	NA	4.9E-10	0.0
Benzo(b)fluoranthene	2.3E-01	0.0E+00	1.1E-07	NA	0.0E+00	1.6E-08	NA	ND	ND	NA	ND	0.0	1.2E-08	1.2E-08	NA	2.3E-08	1.3
Benzo(k)fluoranthene	3.6E-01	0.0E+00	1.7E-07	NA	0.0E+00	2.5E-08	NA	ND	ND	NA	ND	0.0	1.8E-09	1.8E-09	NA	3.6E-09	0.2
Benzo(a)pyrene	4.6E-01	0.0E+00	2.2E-07	NA	0.0E+00	3.2E-08	NA	ND	ND	NA	ND	0.0	2.3E-07	2.3E-07	NA	4.6E-07	26.4
Ideno(1,2,3-cd)pyrene	1.8E-01	0.0E+00	8.6E-08	NA	0.0E+00	1.2E-08	NA	ND	ND	NA	ND	0.0	9.0E-09	9.0E-09	NA	1.8E-08	1.0
Dibenz(a,h)anthracene	8.6E-02	0.0E+00	4.1E-08	NA	0.0E+00	5.9E-09	NA	ND	ND	NA	ND	0.0	4.3E-08	4.3E-08	NA	8.6E-08	4.9
Benzo(g,h,i)perylene	1.9E-01	0.0E+00	9.1E-08	NA	0.0E+00	1.3E-08	NA	ND	ND	NA	ND	0.0	ND	ND	NA	ND	0.0
PESTICIDE/PCB																	
METALS																	
Aluminum	1.1E+04	2.4E-03	5.1E-03	NA	3.4E-04	7.3E-04	NA	2.4E-02	5.1E-03	NA	2.9E-02	18.5	ND	ND	NA	ND	0.0
Arsenic	7.3E+00	1.6E-06	3.5E-06	NA	2.4E-07	5.0E-07	NA	5.5E-03	1.2E-02	NA	1.7E-02	11.0	3.5E-07	7.5E-07	NA	1.1E-06	63.2
Barium	1.7E+02	3.7E-05	8.0E-05	NA	5.3E-06	1.1E-05	NA	7.6E-03	1.1E-03	NA	8.8E-03	5.6	ND	ND	NA	ND	0.0
Cadmium (food/soil)	3.9E+00	8.8E-07	1.9E-06	NA	1.3E-07	2.7E-07	NA	1.8E-02	1.9E-03	NA	1.9E-02	12.4	ND	ND	NA	ND	0.0
Chromium III	1.8E+01	3.9E-06	8.4E-06	NA	5.6E-07	1.2E-06	NA	9.9E-05	8.4E-06	NA	1.1E-04	0.1	ND	ND	NA	ND	0.0
Cobalt	8.6E+00	1.9E-06	4.1E-06	NA	2.8E-07	5.9E-07	NA	3.2E-05	6.9E-05	NA	1.0E-04	0.1	ND	ND	NA	ND	0.0
Copper	4.1E+01	9.1E-06	1.9E-05	NA	1.3E-06	2.8E-06	NA	8.2E-04	5.3E-04	NA	1.4E-03	0.9	ND	ND	NA	ND	0.0
Lead	9.4E+01	2.1E-05	4.5E-05	NA	3.0E-06	6.4E-06	NA	ND	ND	NA	ND	0.0	ND	ND	NA	ND	0.0
Manganese	7.3E+02	1.6E-04	3.5E-04	NA	2.3E-05	5.0E-05	NA	2.9E-02	2.5E-03	NA	3.2E-02	20.3	ND	ND	NA	ND	0.0

Table D-7

EXPOSURE AND HEALTH RISK ESTIMATES
Reasonable Maximum Exposure

Beloit Corporation Remedial Investigation
Rockton, Illinois

Source Area: Rock River
Medium: Sediment

Population: Hypothetical Recreational Users
Land Use: Current Use Scenario

CHEMICAL OF POTENTIAL CONCERN	EPC (mg/kg)	Chronic Daily Intake Values: Noncarcinogenic Dermal	Noncarcinogenic Ingestion	Noncarcinogenic Inhalation	Carcinogenic Dermal	Carcinogenic Ingestion	Carcinogenic Inhalation	Noncancer Hazard Quotients: Dermal Contact	Ingestion	Inhalation	Total	% of Total	Cancer Risks: Dermal Contact	Ingestion	Inhalation	Total	% of Total
Mercury	4.1E+00	9.2E-07	2.0E-06	NA	1.3E-07	2.8E-07	NA	3.1E-03	6.6E-03	NA	9.6E-03	6.2	ND	ND	NA	ND	0.0
Nickel	1.9E+01	4.2E-06	9.0E-06	NA	6.1E-07	1.3E-06	NA	5.3E-03	4.5E-04	NA	5.7E-03	3.7	ND	ND	NA	ND	0.0
Selenium	8.5E-01	1.9E-07	4.1E-07	NA	2.7E-08	5.8E-08	NA	3.8E-05	8.2E-05	NA	1.2E-04	0.1	ND	ND	NA	ND	0.0
Thallium	4.4E-01	9.9E-08	2.1E-07	NA	1.4E-08	3.0E-08	NA	1.2E-03	2.6E-03	NA	3.9E-03	2.5	ND	ND	NA	ND	0.0
Vanadium	2.2E+01	5.0E-06	1.1E-05	NA	7.1E-07	1.5E-06	NA	2.7E-02	1.5E-03	NA	2.9E-02	18.5	ND	ND	NA	ND	0.0
Zinc	1.6E+02	3.5E-05	7.5E-05	NA	5.0E-06	1.1E-05	NA	1.2E-04	2.5E-04	NA	3.7E-04	0.2	ND	ND	NA	ND	0.0
					Total Risks:			1.2E-01	3.4E-02	0.0E+00	1.6E-01	100.0	6.7E-07	1.1E-06	0.0E+00	1.7E-06	100.0

Notes:

1. Adsorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium. It should be noted that consistent with IEPA guidance (IEPA 1994), dermal absorbed doses were not estimated for the PAHs presented above. Rather, the risk associated with PAHs was assessed by doubling the oral risk value.
2. For noncarcinogenic effects, the chronic daily intake (CDI) is averaged over the exposure period; whereas for carcinogenic effects, the CDI is averaged over the lifetime (i.e., 70 years). Therefore, the difference between the CDI for noncarcinogenic vs. carcinogenic effects is due to the different methods of time weighting used to estimate the value.
3. A noncancer risk estimate (HQ) of greater than 1 indicates the potential of noncancer effects (e.g., liver disease) to occur in humans exposed at an assumed level and duration to a contaminated medium. A cancer risk level of greater than 1.0e-04 (i.e., one in ten thousand) is above the U.S.EPA's protective risk range for Superfund Sites.
4. Hazard quotient and cancer risks are unitless values which represent the probability of incurring an adverse health effect. These risk values are calculated using the following relationships:
   Hazard Quotient = Chronic Daily Intake / Reference Dose
   Cancer Risk = Chronic Daily Intake x Slope Factor
5. Hazard Quotients and cancer risks are summarized for applicable routes of exposure. Values for each route are summed to arrive at a total exposure pathway risk. The percentage of total risk is also shown for each compound. In some cases, risks were not determined (ND) because a reference dose or slope factor was not available. NA indicates the route is not applicable.

Legend:
EPC = Exposure Point Concentration

Table D-8

EXPOSURE AND HEALTH RISK ESTIMATES
Reasonable Maximum Exposure

Beloit Corporation Remedial Investigation
Rockton, Illinois

Source Area: On-Beloit Corporation Property
Medium: Surface Soil
Population: Tresspasser
Land Use: Current Use Scenario

CHEMICAL OF POTENTIAL CONCERN	EPC (mg/kg)	Chronic Daily Intake Values: Noncarcinogenic Dermal	Noncarcinogenic Ingestion	Noncarcinogenic Inhalation	Carcinogenic Dermal	Carcinogenic Ingestion	Carcinogenic Inhalation	Noncancer Hazard Quotients: Dermal Contact	Ingestion	Inhalation	Total	% of Total	Cancer Risks: Dermal Contact	Ingestion	Inhalation	Total	% of Total
VOLATILES																	
Acetone	8.9E-02	2.0E-06	4.3E-08	NA	2.9E-07	6.1E-09	NA	2.0E-05	4.3E-07	NA	2.0E-05	0.0	ND	ND	NA	ND	0.0
Tetrachloroethene	8.0E-03	5.4E-09	3.8E-09	NA	7.7E-10	5.5E-10	NA	5.4E-07	3.8E-07	NA	9.2E-07	0.0	4.0E-11	2.8E-11	NA	6.9E-11	0.0
Toluene	6.0E-03	4.1E-09	2.9E-09	NA	5.8E-10	4.1E-10	NA	2.0E-08	1.4E-08	NA	3.5E-08	0.0	ND	ND	NA	ND	0.0
SEMIVOLATILES																	
Acenaphthene	2.3E-01	0.0E+00	1.1E-07	NA	0.0E+00	1.6E-08	NA	1.8E-06	1.8E-06	NA	3.7E-06	0.0	ND	ND	NA	ND	0.0
4-Nitrophenol	1.0E-01	2.3E-06	4.8E-08	NA	3.2E-07	6.8E-09	NA	2.8E-04	6.0E-06	NA	2.9E-04	0.1	ND	ND	NA	ND	0.0
Dibenzofuran	9.5E-02	0.0E+00	4.6E-08	NA	0.0E+00	6.5E-09	NA	ND	1.1E-05	NA	1.1E-05	0.0	ND	ND	NA	ND	0.0
Fluorene	1.9E-01	0.0E+00	9.1E-08	NA	0.0E+00	1.3E-08	NA	2.3E-06	2.3E-06	NA	4.6E-06	0.0	ND	ND	NA	ND	0.0
Phenanthrene	1.6E+00	0.0E+00	7.7E-07	NA	0.0E+00	1.1E-07	NA	ND	ND	NA	ND	0.0	ND	ND	NA	ND	0.0
Anthracene	4.6E-01	0.0E+00	2.2E-07	NA	0.0E+00	3.2E-08	NA	7.4E-07	7.4E-07	NA	1.5E-06	0.0	ND	ND	NA	ND	0.0
Fluoranthene	2.5E+00	0.0E+00	1.2E-06	NA	0.0E+00	1.7E-07	NA	3.0E-05	3.0E-05	NA	6.0E-05	0.0	ND	ND	NA	ND	0.0
Pyrene	1.8E+00	0.0E+00	8.6E-07	NA	0.0E+00	1.2E-07	NA	2.9E-05	2.9E-05	NA	5.8E-05	0.0	ND	ND	NA	ND	0.0
Benzo(a)anthracene	1.0E+00	0.0E+00	4.8E-07	NA	0.0E+00	6.8E-08	NA	ND	ND	NA	ND	0.0	5.0E-08	5.0E-08	NA	1.0E-07	3.9
Chrysene	1.4E+00	0.0E+00	6.7E-07	NA	0.0E+00	9.6E-08	NA	ND	ND	NA	ND	0.0	7.0E-10	7.0E-10	NA	1.4E-09	0.1
bis(2-ethylhexyl)phthalate	2.1E-01	4.7E-06	1.0E-07	NA	6.8E-07	1.4E-08	NA	2.4E-04	5.0E-06	NA	2.4E-04	0.1	9.5E-09	2.0E-10	NA	9.7E-09	0.4
Di-n-octyl Phthalate	1.5E-01	3.4E-06	7.2E-08	NA	4.8E-07	1.0E-08	NA	1.7E-04	3.6E-06	NA	1.7E-04	0.1	ND	ND	NA	ND	0.0
Benzo(b)fluoranthene	1.7E+00	0.0E+00	8.2E-07	NA	0.0E+00	1.2E-07	NA	ND	ND	NA	ND	0.0	8.5E-08	8.5E-08	NA	1.7E-07	6.7
Benzo(k)fluoranthene	1.7E+00	0.0E+00	8.2E-07	NA	0.0E+00	1.2E-07	NA	ND	ND	NA	ND	0.0	8.5E-09	8.5E-09	NA	1.7E-08	0.7
Benzo(a)pyrene	1.0E+00	0.0E+00	4.8E-07	NA	0.0E+00	6.8E-08	NA	ND	ND	NA	ND	0.0	5.0E-07	5.0E-07	NA	1.0E-06	39.4
Ideno(1,2,3-cd)pyrene	7.0E-01	0.0E+00	3.4E-07	NA	0.0E+00	4.8E-08	NA	ND	ND	NA	ND	0.0	3.5E-08	3.5E-08	NA	7.0E-08	2.8
Dibenz(a,h)anthracene	1.1E-01	0.0E+00	5.3E-08	NA	0.0E+00	7.5E-09	NA	ND	ND	NA	ND	0.0	5.5E-08	5.5E-08	NA	1.1E-07	4.3
Benzo(g,h,i)perylene	7.7E-01	0.0E+00	3.7E-07	NA	0.0E+00	5.3E-08	NA	ND	ND	NA	ND	0.0	ND	ND	NA	ND	0.0
Carbazole	1.9E-01	0.0E+00	9.1E-08	NA	0.0E+00	1.3E-08	NA	ND	ND	NA	ND	0.0	ND	2.6E-10	NA	2.6E-10	0.0
PESTICIDE/PCB																	
Aldrin	1.8E-03	4.1E-08	8.6E-10	NA	5.8E-09	1.2E-10	NA	1.4E-03	2.9E-05	NA	1.4E-03	0.4	9.9E-08	2.1E-09	NA	1.0E-07	4.0
4,4'-DDT	3.2E-03	2.2E-09	1.5E-09	NA	3.1E-10	2.2E-10	NA	4.3E-06	3.1E-06	NA	7.4E-06	0.0	1.1E-10	7.5E-11	NA	1.8E-10	0.0
PCB	3.6E-01	4.9E-07	1.7E-07	NA	7.0E-08	2.5E-08	NA	2.4E-02	8.6E-03	NA	3.3E-02	10.4	1.4E-07	4.9E-08	NA	1.9E-07	7.4

Table D-8

EXPOSURE AND HEALTH RISK ESTIMATES
Reasonable Maximum Exposure

Beloit Corporation Remedial Investigation
Rockton, Illinois

Source Area: On-Beloit Corporation Property
Medium: Surface Soil
Population: Tresspasser
Land Use: Current Use Scenario

		Chronic Daily Intake Values						Noncancer Hazard Quotients					Cancer Risks				
		Noncarcinogenic			Carcinogenic			Dermal				% of	Dermal				% of
CHEMICAL OF POTENTIAL CONCERN	EPC (mg/kg)	Dermal	Ingestion	Inhalation	Dermal	Ingestion	Inhalation	Contact	Ingestion	Inhalation	Total	Total	Contact	Ingestion	Inhalation	Total	Total
METALS																	
Aluminum	1.3E+04	2.9E-03	6.2E-03	NA	4.2E-04	8.8E-04	NA	2.9E-02	6.2E-03	NA	3.5E-02	11.1	ND	ND	NA	ND	0.0
Antimony	8.7E+00	2.0E-06	4.2E-06	NA	2.8E-07	6.0E-07	NA	3.3E-02	1.0E-02	NA	4.3E-02	13.5	ND	ND	NA	ND	0.0
Arsenic	5.1E+00	1.1E-06	2.4E-06	NA	1.6E-07	3.5E-07	NA	3.8E-03	8.2E-03	NA	1.2E-02	3.8	2.5E-07	5.2E-07	NA	7.7E-07	30.3
Barium	1.3E+02	2.9E-05	6.1E-05	NA	4.1E-06	8.8E-06	NA	5.9E-03	8.8E-04	NA	6.8E-03	2.1	ND	ND	NA	ND	0.0
Beryllium	6.2E-01	1.4E-07	3.0E-07	NA	2.0E-08	4.2E-08	NA	1.0E-02	1.5E-04	NA	1.0E-02	3.2	ND	ND	NA	ND	0.0
Cadmium (food/soil)	4.3E+00	9.7E-07	2.1E-06	NA	1.4E-07	2.9E-07	NA	1.9E-02	2.1E-03	NA	2.1E-02	6.7	ND	ND	NA	ND	0.0
Chromium III	7.3E+01	1.7E-05	3.5E-05	NA	2.4E-06	5.0E-06	NA	4.1E-04	3.5E-05	NA	4.5E-04	0.1	ND	ND	NA	ND	0.0
Cobalt	8.1E+00	1.8E-06	3.9E-06	NA	2.6E-07	5.5E-07	NA	3.0E-05	6.5E-05	NA	9.5E-05	0.0	ND	ND	NA	ND	0.0
Copper	1.6E+03	3.5E-04	7.4E-04	NA	5.0E-05	1.1E-04	NA	3.1E-02	2.0E-02	NA	5.2E-02	16.2	ND	ND	NA	ND	0.0
Lead	8.3E+02	1.9E-04	4.0E-04	NA	2.7E-05	5.7E-05	NA	ND	ND	NA	ND	0.0	ND	ND	NA	ND	0.0
Manganese	6.8E+02	1.5E-04	3.3E-04	NA	2.2E-05	4.7E-05	NA	2.7E-02	2.3E-03	NA	3.0E-02	9.3	ND	ND	NA	ND	0.0
Mercury	3.9E-01	8.8E-08	1.9E-07	NA	1.3E-08	2.7E-08	NA	2.9E-04	6.2E-04	NA	9.2E-04	0.3	ND	ND	NA	ND	0.0
Nickel	6.6E+01	1.5E-05	3.2E-05	NA	2.1E-06	4.5E-06	NA	1.9E-02	1.6E-03	NA	2.0E-02	6.3	ND	ND	NA	ND	0.0
Selenium	7.1E-01	1.6E-07	3.4E-07	NA	2.3E-08	4.9E-08	NA	3.2E-05	6.8E-05	NA	1.0E-04	0.0	ND	ND	NA	ND	0.0
Silver	2.9E+00	6.5E-07	1.4E-06	NA	9.3E-08	2.0E-07	NA	3.3E-03	2.8E-04	NA	3.5E-03	1.1	ND	ND	NA	ND	0.0
Vanadium	3.7E+01	8.2E-06	1.8E-05	NA	1.2E-06	2.5E-06	NA	4.5E-02	2.5E-03	NA	4.8E-02	15.0	ND	ND	NA	ND	0.0
Zinc	1.3E+02	2.9E-05	6.2E-05	NA	4.2E-06	8.9E-06	NA	9.8E-05	2.1E-04	NA	3.1E-04	0.1	ND	ND	NA	ND	0.0
Cyanide	9.4E-01	6.4E-08	4.5E-07	NA	9.1E-09	6.4E-08	NA	3.2E-06	2.3E-05	NA	2.6E-05	0.0	ND	ND	NA	ND	0.0
						Total Risks:		2.5E-01	6.4E-02	0.0E+00	3.2E-01	100.0	1.2E-06	1.3E-06	0.0E+00	2.5E-06	100.0

Notes:
1. Adsorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium. It should be noted that consistent with IEPA guidance (IEPA 1994), dermal absorbed doses were not estimated for the PAHs presented above. Rather, the risk associated with PAHs was assessed by doubling the oral risk value.
2. For noncarcinogenic effects, the chronic daily intake (CDI) is averaged over the exposure period; whereas for carcinogenic effects, the CDI is averaged over the lifetime (i.e., 70 years). Therefore, the difference between the CDI for noncarcinogenic vs. carcinogenic effects is due to the different methods of time weighting used to estimate the value.
3. A noncancer risk estimate (HQ) of greater than 1 indicates the potential of noncancer effects (e.g., liver disease) to occur in humans exposed at an assumed level and duration to a contaminated medium. A cancer risk level of greater than 1.0e-04 (i.e., one in ten thousand) is above the U.S.EPA's protective risk range for Superfund Sites.
4. Hazard quotient and cancer risks are unitless values which represent the probability of incurring an adverse health effect. These risk values are calculated using the following relationships:
   Hazard Quotient = Chronic Daily Intake / Reference Dose
   Cancer Risk = Chronic Daily Intake x Slope Factor
5. Hazard Quotients and cancer risks are summarized for applicable routes of exposure. Values for each route are summed to arrive at a total exposure pathway risk. The percentage of total risk is also shown for each compound. In some cases, risks were not determined (ND) because a reference dose or slope factor was not available. NA indicates the route is not applicable.

Legend:
EPC = Exposure Point Concentration

Table D-9

EXPOSURE AND HEALTH RISK ESTIMATES

Reasonable Maximum Exposure

Beloit Corporation Remedial Investigation

Rockton, Illinois

Source Area: On-Beloit Corporation Property
Medium: Surface Soil
Population: Beloit Corporation Employees
Land Use: Current Use Scenario

CHEMICAL OF POTENTIAL CONCERN	EPC (mg/kg)	Chronic Daily Intake Values						Noncancer Hazard Quotients					Cancer Risks				
		Noncarcinogenic			Carcinogenic			Dermal Contact	Ingestion	Inhalation	Total	% of Total	Dermal Contact	Ingestion	Inhalation	Total	% of Total
		Dermal	Ingestion	Inhalation	Dermal	Ingestion	Inhalation										
VOLATILES																	
Acetone	8.9E-02	1.3E-06	1.1E-08	2.0E-11	4.5E-07	3.9E-09	7.2E-12	1.3E-05	1.1E-07	ND	1.3E-05	0.0	ND	ND	ND	ND	0.0
Tetrachloroethene	8.0E-03	3.4E-09	9.8E-10	1.8E-12	1.2E-09	3.5E-10	6.5E-13	3.4E-07	9.8E-08	1.3E-11	4.4E-07	0.0	6.3E-11	1.8E-11	1.3E-15	8.1E-11	0.0
Toluene	6.0E-03	2.6E-09	7.3E-10	1.4E-12	9.1E-10	2.6E-10	4.9E-13	1.3E-08	3.7E-09	1.2E-11	1.6E-08	0.0	ND	ND	ND	ND	0.0
SEMIVOLATILES																	
Acenaphthene	2.3E-01	0.0E+00	2.8E-08	5.2E-11	0.0E+00	1.0E-08	1.9E-11	4.7E-07	4.7E-07	ND	9.4E-07	0.0	ND	ND	ND	ND	0.0
4-Nitrophenol	1.0E-01	1.4E-06	1.2E-08	2.3E-11	5.1E-07	4.4E-09	8.1E-12	1.8E-04	1.5E-06	ND	1.8E-04	0.0	ND	ND	ND	ND	0.0
Dibenzofuran	9.5E-02	0.0E+00	1.2E-08	2.2E-11	0.0E+00	4.1E-09	7.7E-12	2.9E-06	2.9E-06	ND	5.8E-06	0.0	ND	ND	ND	ND	0.0
Fluorene	1.9E-01	0.0E+00	2.3E-08	4.3E-11	0.0E+00	8.3E-09	1.5E-11	5.8E-07	5.8E-07	ND	1.2E-06	0.0	ND	ND	ND	ND	0.0
Phenanthrene	1.6E+00	0.0E+00	2.0E-07	3.6E-10	0.0E+00	7.0E-08	1.3E-10	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0
Anthracene	4.6E-01	0.0E+00	5.6E-08	1.0E-10	0.0E+00	2.0E-08	3.7E-11	1.9E-07	1.9E-07	ND	3.8E-07	0.0	ND	ND	ND	ND	0.0
Fluoranthene	2.5E+00	0.0E+00	3.1E-07	5.7E-10	0.0E+00	1.1E-07	2.0E-10	7.6E-06	7.6E-06	ND	1.5E-05	0.0	ND	ND	ND	ND	0.0
Pyrene	1.8E+00	0.0E+00	2.2E-07	4.1E-10	0.0E+00	7.9E-08	1.5E-10	7.3E-06	7.3E-06	ND	1.5E-05	0.0	ND	ND	ND	ND	0.0
Benzo(a)anthracene	1.0E+00	0.0E+00	1.2E-07	2.3E-10	0.0E+00	4.4E-08	8.1E-11	ND	ND	ND	ND	0.0	3.2E-08	3.2E-08	2.5E-11	6.4E-08	2.7
Chrysene	1.4E+00	0.0E+00	1.7E-07	3.2E-10	0.0E+00	6.1E-08	1.1E-10	ND	ND	ND	ND	0.0	4.5E-10	4.5E-10	3.5E-13	8.9E-10	0.0
bis(2-ethylhexyl)phthalate	2.1E-01	3.0E-06	2.6E-08	4.8E-11	1.1E-06	9.2E-09	1.7E-11	1.5E-04	1.3E-06	ND	1.5E-04	0.0	1.5E-08	1.3E-10	2.4E-13	1.5E-08	0.6
Di-n-octyl Phthalate	1.5E-01	2.1E-06	1.8E-08	3.4E-11	7.6E-07	6.6E-09	1.2E-11	1.1E-04	9.2E-07	ND	1.1E-04	0.0	ND	ND	ND	ND	0.0
Benzo(b)fluoranthene	1.7E+00	0.0E+00	2.1E-07	3.9E-10	0.0E+00	7.4E-08	1.4E-10	ND	ND	ND	ND	0.0	5.4E-08	5.4E-08	4.3E-11	1.1E-07	4.6
Benzo(k)fluoranthene	1.7E+00	0.0E+00	2.1E-07	3.9E-10	0.0E+00	7.4E-08	1.4E-10	ND	ND	ND	ND	0.0	5.4E-09	5.4E-09	4.3E-12	1.1E-08	0.5
Benzo(a)pyrene	1.0E+00	0.0E+00	1.2E-07	2.3E-10	0.0E+00	4.4E-08	8.1E-11	ND	ND	ND	ND	0.0	3.2E-07	3.2E-07	2.5E-10	6.4E-07	27.3
Ideno(1,2,3-cd)pyrene	7.0E-01	0.0E+00	8.6E-08	1.6E-10	0.0E+00	3.1E-08	5.7E-11	ND	ND	ND	ND	0.0	2.2E-08	2.2E-08	1.8E-11	4.5E-08	1.9
Dibenz(a,h)anthracene	1.1E-01	0.0E+00	1.3E-08	2.5E-11	0.0E+00	4.8E-09	9.0E-12	ND	ND	ND	ND	0.0	3.5E-08	3.5E-08	2.8E-11	7.0E-08	3.0
Benzo(g,h,i)perylene	7.7E-01	0.0E+00	9.4E-08	1.8E-10	0.0E+00	3.4E-08	6.3E-11	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0
Carbazole	1.9E-01	0.0E+00	2.3E-08	4.3E-11	0.0E+00	8.3E-09	1.5E-11	ND	ND	ND	ND	0.0	ND	1.7E-10	ND	1.7E-10	0.0
PESTICIDE/PCB																	
Aldrin	1.8E-03	2.6E-08	2.2E-10	4.1E-13	9.1E-09	7.9E-11	1.5E-13	8.5E-04	7.3E-06	ND	8.6E-04	0.2	1.6E-07	1.3E-09	2.5E-12	1.6E-07	6.7
4,4'-DDT	3.2E-03	1.4E-09	3.9E-10	7.3E-13	4.9E-10	1.4E-10	2.6E-13	2.7E-06	7.8E-07	ND	3.5E-06	0.0	1.7E-10	4.8E-11	8.9E-14	2.1E-10	0.0
PCB	3.6E-01	3.1E-07	4.4E-08	8.2E-11	1.1E-07	1.6E-08	2.9E-11	1.5E-02	2.2E-03	ND	1.8E-02	4.7	2.2E-07	3.1E-08	5.9E-11	2.5E-07	10.7

Table D-9

EXPOSURE AND HEALTH RISK ESTIMATES

Reasonable Maximum Exposure

Beloit Corporation Remedial Investigation

Rockton, Illinois

Source Area: On-Beloit Corporation Property
Medium: Surface Soil

Population: Beloit Corporation Employees
Land Use: Current Use Scenario

CHEMICAL OF POTENTIAL CONCERN	EPC (mg/kg)	Chronic Daily Intake Values: Noncarcinogenic Dermal	Noncarcinogenic Ingestion	Noncarcinogenic Inhalation	Carcinogenic Dermal	Carcinogenic Ingestion	Carcinogenic Inhalation	Noncancer Hazard Quotients: Dermal Contact	Ingestion	Inhalation	Total	% of Total	Cancer Risks: Dermal Contact	Ingestion	Inhalation	Total	% of Total
METALS																	
Aluminum	1.3E+04	1.8E-03	1.6E-03	2.9E-06	6.5E-04	5.6E-04	1.1E-06	1.8E-02	1.6E-03	2.9E-03	2.3E-02	6.2	ND	ND	ND	ND	0.0
Antimony	8.7E+00	1.2E-06	1.1E-06	2.0E-09	4.4E-07	3.8E-07	7.1E-10	2.1E-02	2.7E-03	ND	2.3E-02	6.3	ND	ND	ND	ND	0.0
Arsenic	5.1E+00	7.2E-07	6.2E-07	1.2E-09	2.6E-07	2.2E-07	4.2E-10	2.4E-03	2.1E-03	ND	4.5E-03	1.2	3.9E-07	3.3E-07	6.2E-09	7.3E-07	31.2
Barium	1.3E+02	1.8E-05	1.6E-05	2.9E-08	6.5E-06	5.6E-06	1.0E-08	3.7E-03	2.2E-04	2.1E-04	4.1E-03	1.1	ND	ND	ND	ND	0.0
Beryllium	6.2E-01	8.8E-08	7.6E-08	1.4E-10	3.1E-08	2.7E-08	5.0E-11	6.3E-03	3.8E-05	2.5E-05	6.3E-03	1.7	ND	ND	4.2E-10	4.2E-10	0.0
Cadmium (water)	4.3E+00	6.1E-07	5.3E-07	9.8E-10	2.2E-07	1.9E-07	3.5E-10	4.9E-02	1.1E-03	1.7E-05	5.0E-02	13.5	ND	ND	2.2E-09	2.2E-09	0.1
Chromium VI	7.3E+01	1.0E-05	9.0E-06	1.7E-08	3.7E-06	3.2E-06	6.0E-09	1.4E-01	3.0E-03	5.9E-04	1.4E-01	38.5	ND	ND	2.4E-07	2.4E-07	10.5
Cobalt	8.1E+00	1.1E-06	9.9E-07	1.8E-09	4.1E-07	3.5E-07	6.6E-10	1.9E-05	1.7E-05	ND	3.6E-05	0.0	ND	ND	ND	ND	0.0
Copper	1.6E+03	2.2E-04	1.9E-04	3.5E-07	7.9E-05	6.8E-05	1.3E-07	2.0E-02	5.1E-03	ND	2.5E-02	6.7	ND	ND	ND	ND	0.0
Lead	8.3E+02	1.2E-04	1.0E-04	1.9E-07	4.2E-05	3.6E-05	6.7E-08	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0
Manganese	6.8E+02	9.7E-05	8.3E-05	1.6E-07	3.5E-05	3.0E-05	5.5E-08	1.7E-02	5.9E-04	1.1E-02	2.9E-02	7.8	ND	ND	ND	ND	0.0
Mercury	3.9E-01	5.5E-08	4.8E-08	8.9E-11	2.0E-08	1.7E-08	3.2E-11	1.8E-04	1.6E-04	1.0E-06	3.4E-04	0.1	ND	ND	ND	ND	0.0
Nickel	6.6E+01	9.3E-06	8.1E-06	1.5E-08	3.3E-06	2.9E-06	5.4E-09	1.2E-02	4.0E-04	ND	1.2E-02	3.3	ND	ND	ND	ND	0.0
Selenium	7.1E-01	1.0E-07	8.7E-08	1.6E-10	3.6E-08	3.1E-08	5.8E-11	2.0E-05	1.7E-05	ND	3.8E-05	0.0	ND	ND	ND	ND	0.0
Silver	2.9E+00	4.1E-07	3.5E-07	6.6E-10	1.5E-07	1.3E-07	2.4E-10	2.1E-03	7.1E-05	ND	2.1E-03	0.6	ND	ND	ND	ND	0.0
Vanadium	3.7E+01	5.2E-06	4.5E-06	8.3E-09	1.8E-06	1.6E-06	3.0E-09	2.8E-02	6.4E-04	ND	2.9E-02	7.9	ND	ND	ND	ND	0.0
Zinc	1.3E+02	1.8E-05	1.6E-05	3.0E-08	6.6E-06	5.7E-06	1.1E-08	6.1E-05	5.3E-05	ND	1.1E-04	0.0	ND	ND	ND	ND	0.0
Cyanide	9.4E-01	1.3E-07	1.1E-07	2.1E-10	4.8E-08	4.1E-08	7.7E-11	6.7E-06	5.7E-06	ND	1.2E-05	0.0	ND	ND	ND	ND	0.0
						Total Risks:		3.4E-01	2.0E-02	1.5E-02	3.7E-01	100.0	1.2E-06	8.4E-07	2.5E-07	2.3E-06	100.0

Notes:

1. Adsorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium. It should be noted that consistent with IEPA guidance (IEPA 1994), dermal absorbed doses were not estimated for the PAHs presented above. Rather, the risk associated with PAHs was assessed by doubling the oral risk value.
2. For noncarcinogenic effects, the chronic daily intake (CDI) is averaged over the exposure period; whereas for carcinogenic effects, the CDI is averaged over the lifetime (i.e., 70 years). Therefore, the difference between the CDI for noncarcinogenic vs. carcinogenic effects is due to the different methods of time weighting used to estimate the value.
3. A noncancer risk estimate (HQ) of greater than 1 indicates the potential of noncancer effects (e.g., liver disease) to occur in humans exposed at an assumed level and duration to a contaminated medium. A cancer risk level of greater than 1.0e-04 (i.e., one in ten thousand) is above the U.S.EPA's protective risk range for Superfund Sites.
4. Hazard quotient and cancer risks are unitless values which represent the probability of incurring an adverse health effect. These risk values are calculated using the following relationships:
   Hazard Quotient = Chronic Daily Intake / Reference Dose
   Cancer Risk = Chronic Daily Intake x Slope Factor
5. Hazard Quotients and cancer risks are summarized for applicable routes of exposure. Values for each route are summed to arrive at a total exposure pathway risk. The percentage of total risk is also shown for each compound. In some cases, risks were not determined (ND) because a reference dose or slope factor was not available. NA indicates the route is not applicable.

Legend:
EPC = Exposure Point Concentration

Table D-10

EXPOSURE AND HEALTH RISK ESTIMATES

Reasonable Maximum Exposure

Beloit Corporation Remedial Investigation

Rockton, Illinois

Source Area: On-Beloit Corporation Property
Medium: Surface Soil

Population: Future Workers
Land Use: Future Use Scenario

CHEMICAL OF POTENTIAL CONCERN	EPC (mg/kg)	Chronic Daily Intake Values: Noncarcinogenic Dermal	Noncarcinogenic Ingestion	Noncarcinogenic Inhalation	Carcinogenic Dermal	Carcinogenic Ingestion	Carcinogenic Inhalation	Noncancer Hazard Quotients: Dermal Contact	Ingestion	Inhalation	Total	% of Total	Cancer Risks: Dermal Contact	Ingestion	Inhalation	Total	% of Total
VOLATILES																	
Acetone	8.9E-02	5.1E-06	4.4E-08	2.0E-11	1.8E-06	1.6E-08	7.2E-12	5.1E-05	4.4E-07	ND	5.1E-05	0.0	ND	ND	ND	ND	0.0
Tetrachloroethene	8.0E-03	1.4E-08	3.9E-09	1.8E-12	4.9E-09	1.4E-09	6.5E-13	1.4E-06	3.9E-07	1.3E-11	1.8E-06	0.0	2.5E-10	7.3E-11	1.3E-15	3.3E-10	0.0
Toluene	6.0E-03	1.0E-08	2.9E-09	1.4E-12	3.6E-09	1.0E-09	4.9E-13	5.1E-08	1.5E-08	1.2E-11	6.6E-08	0.0	ND	ND	ND	ND	0.0
SEMIVOLATILES																	
Acenaphthene	2.3E-01	0.0E+00	1.1E-07	5.2E-11	0.0E+00	4.0E-08	1.9E-11	1.9E-06	1.9E-06	ND	3.8E-06	0.0	ND	ND	ND	ND	0.0
4-Nitrophenol	1.0E-01	5.7E-06	4.9E-08	2.3E-11	2.0E-06	1.7E-08	8.1E-12	7.1E-04	6.1E-06	ND	7.2E-04	0.0	ND	ND	ND	ND	0.0
Dibenzofuran	9.5E-02	0.0E+00	4.6E-08	2.2E-11	0.0E+00	1.7E-08	7.7E-12	1.2E-05	1.2E-05	ND	2.3E-05	0.0	ND	ND	ND	ND	0.0
Fluorene	1.9E-01	0.0E+00	9.3E-08	4.3E-11	0.0E+00	3.3E-08	1.5E-11	2.3E-06	2.3E-06	ND	4.6E-06	0.0	ND	ND	ND	ND	0.0
Phenanthrene	1.6E+00	0.0E+00	7.8E-07	3.6E-10	0.0E+00	2.8E-07	1.3E-10	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0
Anthracene	4.6E-01	0.0E+00	2.3E-07	1.0E-10	0.0E+00	8.0E-08	3.7E-11	7.5E-07	7.5E-07	ND	1.5E-06	0.0	ND	ND	ND	ND	0.0
Fluoranthene	2.5E+00	0.0E+00	1.2E-06	5.7E-10	0.0E+00	4.4E-07	2.0E-10	3.1E-05	3.1E-05	ND	6.1E-05	0.0	ND	ND	ND	ND	0.0
Pyrene	1.8E+00	0.0E+00	8.8E-07	4.1E-10	0.0E+00	3.1E-07	1.5E-10	2.9E-05	2.9E-05	ND	5.9E-05	0.0	ND	ND	ND	ND	0.0
Benzo(a)anthracene	1.0E+00	0.0E+00	4.9E-07	2.3E-10	0.0E+00	1.7E-07	8.1E-11	ND	ND	ND	ND	0.0	1.3E-07	1.3E-07	2.5E-11	2.6E-07	3.0
Chrysene	1.4E+00	0.0E+00	6.8E-07	3.2E-10	0.0E+00	2.4E-07	1.1E-10	ND	ND	ND	ND	0.0	1.8E-09	1.8E-09	3.5E-13	3.6E-09	0.0
bis(2-ethylhexyl)phthalate	2.1E-01	1.2E-05	1.0E-07	4.8E-11	4.3E-06	3.7E-08	1.7E-11	6.0E-04	5.1E-06	ND	6.0E-04	0.0	6.0E-08	5.1E-10	2.4E-13	6.0E-08	0.7
Di-n-octyl Phthalate	1.5E-01	8.5E-06	7.3E-08	3.4E-11	3.0E-06	2.6E-08	1.2E-11	4.3E-04	3.7E-06	ND	4.3E-04	0.0	ND	ND	ND	ND	0.0
Benzo(b)fluoranthene	1.7E+00	0.0E+00	8.3E-07	3.9E-10	0.0E+00	3.0E-07	1.4E-10	ND	ND	ND	ND	0.0	2.2E-07	2.2E-07	4.3E-11	4.3E-07	5.1
Benzo(k)fluoranthene	1.7E+00	0.0E+00	8.3E-07	3.9E-10	0.0E+00	3.0E-07	1.4E-10	ND	ND	ND	ND	0.0	2.2E-08	2.2E-08	4.3E-12	4.3E-08	0.5
Benzo(a)pyrene	1.0E+00	0.0E+00	4.9E-07	2.3E-10	0.0E+00	1.7E-07	8.1E-11	ND	ND	ND	ND	0.0	1.3E-06	1.3E-06	2.5E-10	2.6E-06	29.7
Ideno(1,2,3-cd)pyrene	7.0E-01	0.0E+00	3.4E-07	1.6E-10	0.0E+00	1.2E-07	5.7E-11	ND	ND	ND	ND	0.0	8.9E-08	8.9E-08	1.8E-11	1.8E-07	2.1
Dibenz(a,h)anthracene	1.1E-01	0.0E+00	5.4E-08	2.5E-11	0.0E+00	1.9E-08	9.0E-12	ND	ND	ND	ND	0.0	1.4E-07	1.4E-07	2.8E-11	2.8E-07	3.3
Benzo(g,h,i)perylene	7.7E-01	0.0E+00	3.8E-07	1.8E-10	0.0E+00	1.3E-07	6.3E-11	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0
Carbazole	1.9E-01	0.0E+00	9.3E-08	4.3E-11	0.0E+00	3.3E-08	1.5E-11	ND	ND	ND	ND	0.0	ND	6.6E-10	ND	6.6E-10	0.0
PESTICIDE/PCB																	
Aldrin	1.8E-03	1.0E-07	8.8E-10	4.1E-13	3.6E-08	3.1E-10	1.5E-13	3.4E-03	2.9E-05	ND	3.4E-03	0.2	6.2E-07	5.4E-09	2.5E-12	6.3E-07	7.3
4,4'-DDT	3.2E-03	5.4E-09	1.6E-09	7.3E-13	1.9E-09	5.6E-10	2.6E-13	1.1E-05	3.1E-06	ND	1.4E-05	0.0	6.6E-10	1.9E-10	8.9E-14	8.5E-10	0.0
PCB	3.6E-01	1.2E-06	1.8E-07	8.2E-11	4.4E-07	6.3E-08	2.9E-11	6.1E-02	8.8E-03	ND	7.0E-02	4.9	8.8E-07	1.3E-07	5.9E-11	1.0E-06	11.7
METALS																	
Aluminum	1.3E+04	7.3E-03	6.3E-03	2.9E-06	2.6E-03	2.3E-03	1.1E-06	7.3E-02	6.3E-03	2.9E-03	8.2E-02	5.7	ND	ND	ND	ND	0.0
Antimony	8.7E+00	4.9E-06	4.3E-06	2.0E-09	1.8E-06	1.5E-06	7.1E-10	8.2E-02	1.1E-02	ND	9.3E-02	6.5	ND	ND	ND	ND	0.0
Arsenic	5.1E+00	2.9E-06	2.5E-06	1.2E-09	1.0E-06	8.9E-07	4.2E-10	9.6E-03	8.3E-03	ND	1.8E-02	1.3	1.6E-06	1.3E-06	6.2E-09	2.9E-06	33.7
Barium	1.3E+02	7.3E-05	6.3E-05	2.9E-08	2.6E-05	2.2E-05	1.0E-08	1.5E-02	8.9E-04	2.1E-04	1.6E-02	1.1	ND	ND	ND	ND	0.0

Table D-10

EXPOSURE AND HEALTH RISK ESTIMATES

Reasonable Maximum Exposure

Beloit Corporation Remedial Investigation

Rockton, Illinois

Source Area: On-Beloit Corporation Property
Medium: Surface Soil

Population: Future Workers
Land Use: Future Use Scenario

CHEMICAL OF POTENTIAL CONCERN	EPC (mg/kg)	Chronic Daily Intake Values: Noncarcinogenic Dermal	Noncarcinogenic Ingestion	Noncarcinogenic Inhalation	Carcinogenic Dermal	Carcinogenic Ingestion	Carcinogenic Inhalation	Noncancer Hazard Quotients: Dermal Contact	Ingestion	Inhalation	Total	% of Total	Cancer Risks: Dermal Contact	Ingestion	Inhalation	Total	% of Total
Beryllium	6.2E-01	3.5E-07	3.0E-07	1.4E-10	1.3E-07	1.1E-07	5.0E-11	2.5E-02	1.5E-04	2.5E-05	2.5E-02	1.8	ND	ND	4.2E-10	4.2E-10	0.0
Cadmium (water)	4.3E+00	2.4E-06	2.1E-06	9.8E-10	8.7E-07	7.5E-07	3.5E-10	2.0E-01	4.2E-03	1.7E-05	2.0E-01	13.9	ND	ND	2.2E-09	2.2E-09	0.0
Chromium VI	7.3E+01	4.2E-05	3.6E-05	1.7E-08	1.5E-05	1.3E-05	6.0E-09	5.6E-01	1.2E-02	5.9E-04	5.7E-01	39.6	ND	ND	2.4E-07	2.4E-07	2.9
Cobalt	8.1E+00	4.6E-06	4.0E-06	1.8E-09	1.6E-06	1.4E-06	6.6E-10	7.7E-05	6.6E-05	ND	1.4E-04	0.0	ND	ND	ND	ND	0.0
Copper	1.6E+03	8.8E-04	7.6E-04	3.5E-07	3.1E-04	2.7E-04	1.3E-07	7.9E-02	2.0E-02	ND	1.0E-01	7.0	ND	ND	ND	ND	0.0
Lead	8.3E+02	4.7E-04	4.0E-04	1.9E-07	1.7E-04	1.4E-04	6.7E-08	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0
Manganese	6.8E+02	3.9E-04	3.3E-04	1.6E-07	1.4E-04	1.2E-04	5.5E-08	6.9E-02	2.4E-03	1.1E-02	8.2E-02	5.7	ND	ND	ND	ND	0.0
Mercury	3.9E-01	2.2E-07	1.9E-07	8.9E-11	7.9E-08	6.8E-08	3.2E-11	7.4E-04	6.4E-04	1.0E-06	1.4E-03	0.1	ND	ND	ND	ND	0.0
Nickel	6.6E+01	3.7E-05	3.2E-05	1.5E-08	1.3E-05	1.2E-05	5.4E-09	4.7E-02	1.6E-03	ND	4.8E-02	3.4	ND	ND	ND	ND	0.0
Selenium	7.1E-01	4.0E-07	3.5E-07	1.6E-10	1.4E-07	1.2E-07	5.8E-11	8.1E-05	6.9E-05	ND	1.5E-04	0.0	ND	ND	ND	ND	0.0
Silver	2.9E+00	1.6E-06	1.4E-06	6.6E-10	5.9E-07	5.1E-07	2.4E-10	8.2E-03	2.8E-04	ND	8.5E-03	0.6	ND	ND	ND	ND	0.0
Vanadium	3.7E+01	2.1E-05	1.8E-05	8.3E-09	7.4E-06	6.4E-06	3.0E-09	1.1E-01	2.6E-03	ND	1.2E-01	8.1	ND	ND	ND	ND	0.0
Zinc	1.3E+02	7.4E-05	6.4E-05	3.0E-08	2.6E-05	2.3E-05	1.1E-08	2.5E-04	2.1E-04	ND	4.6E-04	0.0	ND	ND	ND	ND	0.0
Cyanide	9.4E-01	5.3E-07	4.6E-07	2.1E-10	1.9E-07	1.6E-07	7.7E-11	2.7E-05	2.3E-05	ND	5.0E-05	0.0	ND	ND	ND	ND	0.0
					Total Risks:			1.3E+00	8.0E-02	1.5E-02	1.4E+00	100.0	5.0E-06	3.3E-06	2.5E-07	8.6E-06	100.0

Notes:

1. Adsorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium. It should be noted that consistent with IEPA guidance (IEPA 1994), dermal absorbed doses were not estimated for the PAHs presented above. Rather, the risk associated with PAHs was assessed by doubling the oral risk value.
2. For noncarcinogenic effects, the chronic daily intake (CDI) is averaged over the exposure period; whereas for carcinogenic effects, the CDI is averaged over the lifetime (i.e., 70 years). Therefore, the difference between the CDI for noncarcinogenic vs. carcinogenic effects is due to the different methods of time weighting used to estimate the value.
3. A noncancer risk estimate (HQ) of greater than 1 indicates the potential of noncancer effects (e.g., liver disease) to occur in humans exposed at an assumed level and duration to a contaminated medium. A cancer risk level of greater than 1.0e-04 (i.e., one in ten thousand) is above the U.S.EPA's protective risk range for Superfund Sites.
4. Hazard quotient and cancer risks are unitless values which represent the probability of incurring an adverse health effect. These risk values are calculated using the following relationships:
   Hazard Quotient = Chronic Daily Intake / Reference Dose
   Cancer Risk = Chronic Daily Intake x Slope Factor
5. Hazard Quotients and cancer risks are summarized for applicable routes of exposure. Values for each route are summed to arrive at a total exposure pathway risk. The percentage of total risk is also shown for each compound. In some cases, risks were not determined (ND) because a reference dose or slope factor was not available. NA indicates the route is not applicable.

Legend:
EPC = Exposure Point Concentration

Table D-11

EXPOSURE AND HEALTH RISK ESTIMATES

Reasonable Maximum Exposure

Beloit Corporation Remedial Investigation

Rockton, Illinois

Source Area: On-Beloit Corporation Property
Medium: Soil - 0 ft to 10 ft

Population: Construction Worker
Land Use: Current Use Scenario

CHEMICAL OF POTENTIAL CONCERN	EPC (mg/kg)	Chronic Daily Intake Values: Noncarcinogenic Dermal	Noncarcinogenic Ingestion	Noncarcinogenic Inhalation	Carcinogenic Dermal	Carcinogenic Ingestion	Carcinogenic Inhalation	Noncancer Hazard Quotients: Dermal Contact	Ingestion	Inhalation	Total	% of Total	Cancer Risks: Dermal Contact	Ingestion	Inhalation	Total	% of Total
VOLATILES																	
Acetone	8.9E-02	9.1E-07	7.5E-08	1.6E-09	1.3E-08	1.1E-09	2.3E-11	9.1E-07	7.5E-08	ND	9.8E-07	0.0	ND	ND	ND	ND	0.0
Tetrachloroethene	8.0E-03	2.5E-09	6.8E-09	1.5E-10	3.5E-11	9.7E-11	2.1E-12	2.5E-08	6.8E-08	ND	9.2E-08	0.0	1.8E-12	5.0E-12	4.2E-15	6.8E-12	0.0
Toluene	6.0E-03	1.8E-09	5.1E-09	1.1E-10	2.6E-11	7.2E-11	1.6E-12	9.2E-10	2.5E-09	ND	3.5E-09	0.0	ND	ND	ND	ND	0.0
Ethylbenzene	8.0E-03	2.5E-09	6.8E-09	1.5E-10	3.5E-11	9.7E-11	2.1E-12	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0
Xylenes (mixed)	2.5E-01	7.7E-08	2.1E-07	4.6E-09	1.1E-09	3.0E-09	6.5E-11	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0
SEMIVOLATILES																	
Naphthalene	7.5E-02	0.0E+00	6.3E-08	1.4E-09	0.0E+00	9.1E-10	2.0E-11	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0
Acenaphthene	7.0E-01	0.0E+00	5.9E-07	1.3E-08	0.0E+00	8.5E-09	1.8E-10	9.9E-07	9.9E-07	ND	2.0E-06	0.0	ND	ND	ND	ND	0.0
4-Nitrophenol	1.0E-01	1.0E-06	8.5E-08	1.8E-09	1.5E-08	1.2E-09	2.6E-11	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0
Dibenzofuran	1.9E-01	0.0E+00	1.6E-07	3.5E-09	0.0E+00	2.3E-09	5.0E-11	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0
Fluorene	3.8E-01	0.0E+00	3.2E-07	7.0E-09	0.0E+00	4.6E-09	9.9E-11	8.0E-07	8.0E-07	ND	1.6E-06	0.0	ND	ND	ND	ND	0.0
Phenanthrene	1.6E+00	0.0E+00	1.4E-06	2.9E-08	0.0E+00	1.9E-08	4.2E-10	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0
Anthracene	4.6E-01	0.0E+00	3.9E-07	8.4E-09	0.0E+00	5.6E-09	1.2E-10	1.3E-07	1.3E-07	ND	2.6E-07	0.0	ND	ND	ND	ND	0.0
Fluoranthene	2.5E+00	0.0E+00	2.1E-06	4.6E-08	0.0E+00	3.0E-08	6.5E-10	5.3E-06	5.3E-06	ND	1.1E-05	0.0	ND	ND	ND	ND	0.0
Pyrene	1.8E+00	0.0E+00	1.5E-06	3.3E-08	0.0E+00	2.2E-08	4.7E-10	5.1E-06	5.1E-06	ND	1.0E-05	0.0	ND	ND	ND	ND	0.0
Benzo(a)anthracene	1.0E+00	0.0E+00	8.5E-07	1.8E-08	0.0E+00	1.2E-08	2.6E-10	ND	ND	ND	ND	0.0	8.8E-09	8.8E-09	8.1E-11	1.8E-08	4.3
Chrysene	1.4E+00	0.0E+00	1.2E-06	2.6E-08	0.0E+00	1.7E-08	3.7E-10	ND	ND	ND	ND	0.0	1.2E-10	1.2E-10	1.1E-12	2.5E-10	0.1
bis(2-ethylhexyl)phthalate	5.5E-01	5.6E-06	4.6E-07	1.0E-08	8.0E-08	6.6E-09	1.4E-10	ND	ND	ND	ND	0.0	1.1E-09	9.3E-11	2.0E-12	1.2E-09	0.3
Di-n-octyl Phthalate	1.5E-01	1.5E-06	1.3E-07	2.7E-09	2.2E-08	1.8E-09	3.9E-11	7.7E-05	6.3E-06	ND	8.3E-05	0.0	ND	ND	ND	ND	0.0
Benzo(b)fluoranthene	1.7E+00	0.0E+00	1.4E-06	3.1E-08	0.0E+00	2.1E-08	4.4E-10	ND	ND	ND	ND	0.0	1.5E-08	1.5E-08	1.4E-10	3.0E-08	7.2
Benzo(k)fluoranthene	1.7E+00	0.0E+00	1.4E-06	3.1E-08	0.0E+00	2.1E-08	4.4E-10	ND	ND	ND	ND	0.0	1.5E-09	1.5E-09	1.4E-11	3.0E-09	0.7
Benzo(a)pyrene	1.0E+00	0.0E+00	8.5E-07	1.8E-08	0.0E+00	1.2E-08	2.6E-10	ND	ND	ND	ND	0.0	8.8E-08	8.8E-08	8.1E-10	1.8E-07	42.6
Ideno(1,2,3-cd)pyrene	7.8E-01	0.0E+00	6.6E-07	1.4E-08	0.0E+00	9.4E-09	2.0E-10	ND	ND	ND	ND	0.0	6.9E-09	6.9E-09	6.3E-11	1.4E-08	3.3
Dibenz(a,h)anthracene	1.1E-01	0.0E+00	9.3E-08	2.0E-09	0.0E+00	1.3E-09	2.9E-11	ND	ND	ND	ND	0.0	9.7E-09	9.7E-09	8.9E-11	1.9E-08	4.7
Benzo(g,h,i)perylene	8.3E-01	0.0E+00	7.0E-07	1.5E-08	0.0E+00	1.0E-08	2.2E-10	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0
Carbazole	1.9E-01	0.0E+00	1.6E-07	3.5E-09	0.0E+00	2.3E-09	5.0E-11	ND	ND	ND	ND	0.0	ND	4.6E-11	ND	4.6E-11	0.0
PESTICIDE/PCB																	
Aldrin	1.8E-03	1.8E-08	1.5E-09	3.3E-11	2.6E-10	2.2E-11	4.7E-13	6.1E-04	5.1E-05	ND	6.6E-04	0.3	4.5E-09	3.7E-10	8.1E-12	4.9E-09	1.2
4,4'-DDT	3.2E-03	9.8E-10	2.7E-09	5.9E-11	1.4E-11	3.9E-11	8.4E-13	2.0E-06	5.4E-06	ND	7.4E-06	0.0	4.8E-12	1.3E-11	2.8E-13	1.8E-11	0.0
PCB	3.6E-01	2.2E-07	3.0E-07	6.6E-09	3.2E-09	4.3E-09	9.4E-11	ND	ND	ND	ND	0.0	6.3E-09	8.7E-09	1.9E-10	1.5E-08	3.7

Table D-11

EXPOSURE AND HEALTH RISK ESTIMATES

Reasonable Maximum Exposure

Beloit Corporation Remedial Investigation

Rockton, Illinois

Source Area: On-Beloit Corporation Property
Medium: Soil - 0 ft to 10 ft

Population: Construction Worker
Land Use: Current Use Scenario

CHEMICAL OF POTENTIAL CONCERN	EPC (mg/kg)	Chronic Daily Intake Values: Noncarcinogenic Dermal	Noncarcinogenic Ingestion	Noncarcinogenic Inhalation	Carcinogenic Dermal	Carcinogenic Ingestion	Carcinogenic Inhalation	Noncancer Hazard Quotients: Dermal Contact	Ingestion	Inhalation	Total	% of Total	Cancer Risks: Dermal Contact	Ingestion	Inhalation	Total	% of Total
METALS																	
Aluminum	1.3E+04	1.3E-03	1.1E-02	2.4E-04	1.9E-05	1.6E-04	3.4E-06	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0
Antimony	1.2E+01	1.2E-06	1.0E-05	2.2E-07	1.7E-08	1.4E-07	3.1E-09	2.0E-02	2.5E-02	ND	4.5E-02	18.4	ND	ND	ND	ND	0.0
Arsenic	5.1E+00	5.2E-07	4.3E-06	9.3E-08	7.4E-09	6.2E-08	1.3E-09	1.7E-03	1.4E-02	ND	1.6E-02	6.6	1.1E-08	9.2E-08	2.0E-08	1.2E-07	29.7
Barium	1.3E+02	1.3E-05	1.1E-04	2.3E-06	1.9E-07	1.5E-06	3.3E-08	2.7E-03	1.5E-03	1.6E-03	5.9E-03	2.4	ND	ND	ND	ND	0.0
Beryllium	1.1E+00	1.1E-07	9.3E-07	2.0E-08	1.6E-09	1.3E-08	2.9E-10	3.2E-03	1.9E-04	ND	3.4E-03	1.4	ND	ND	2.4E-09	2.4E-09	0.6
Cadmium (water)	4.3E+00	4.4E-07	3.6E-06	7.9E-08	6.3E-09	5.2E-08	1.1E-09	ND	ND	ND	ND	0.0	ND	ND	7.1E-09	7.1E-09	1.7
Chromium III	7.3E+01	7.5E-06	6.2E-05	1.3E-06	1.1E-07	8.9E-07	1.9E-08	1.9E-04	6.2E-05	6.7E-02	6.7E-02	27.6	ND	ND	ND	ND	0.0
Cobalt	8.1E+00	8.3E-07	6.8E-06	1.5E-07	1.2E-08	9.8E-08	2.1E-09	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0
Copper	1.6E+03	1.6E-04	1.3E-03	2.8E-05	2.3E-06	1.9E-05	4.1E-07	1.4E-02	3.5E-02	ND	5.0E-02	20.3	ND	ND	ND	ND	0.0
Lead	8.3E+02	8.4E-05	7.0E-04	1.5E-05	1.2E-06	1.0E-05	2.2E-07	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0
Manganese	6.8E+02	7.0E-05	5.8E-04	1.2E-05	9.9E-07	8.2E-06	1.8E-07	1.2E-02	4.1E-03	ND	1.7E-02	6.8	ND	ND	ND	ND	0.0
Mercury	3.9E-01	4.0E-08	3.3E-07	7.1E-09	5.7E-10	4.7E-09	1.0E-10	1.3E-04	1.1E-03	8.3E-05	1.3E-03	0.5	ND	ND	ND	ND	0.0
Nickel	6.6E+01	6.7E-06	5.6E-05	1.2E-06	9.6E-08	8.0E-07	1.7E-08	8.4E-03	2.8E-03	ND	1.1E-02	4.6	ND	ND	ND	ND	0.0
Selenium	7.1E-01	7.3E-08	6.0E-07	1.3E-08	1.0E-09	8.6E-09	1.9E-10	1.5E-05	1.2E-04	ND	1.3E-04	0.1	ND	ND	ND	ND	0.0
Silver	2.9E+00	3.0E-07	2.5E-06	5.3E-08	4.2E-09	3.5E 08	7.6E-10	1.5E-03	4.9E-04	ND	2.0E-03	0.8	ND	ND	ND	ND	0.0
Vanadium	3.7E+01	3.7E-06	3.1E-05	6.7E-07	5.3E-08	4.4E-07	9.6E-09	2.0E-02	4.4E-03	ND	2.5E-02	10.2	ND	ND	ND	ND	0.0
Zinc	1.3E+02	1.3E-05	1.1E-04	2.4E-06	1.9E-07	1.6E-06	3.4E-08	4.4E-05	3.7E-04	ND	4.1E-04	0.2	ND	ND	ND	ND	0.0
Cyanide	9.4E-01	2.9E-08	7.9E-07	1.7E-08	4.1E-10	1.1E-08	2.5E-10	1.4E-06	4.0E-05	ND	4.1E-05	0.0	ND	ND	ND	ND	0.0
						Total Risks:		8.6E-02	9.0E-02	6.9E-02	2.4E-01	100.0	1.5E-07	2.3E-07	3.1E-08	4.2E-07	100.0

Notes:

1. Adsorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium. It should be noted that consistent with IEPA guidance (IEPA 1994), dermal absorbed doses were not estimated for the PAHs presented above. Rather, the risk associated with PAHs was assessed by doubling the oral risk value.
2. For noncarcinogenic effects, the chronic daily intake (CDI) is averaged over the exposure period; whereas for carcinogenic effects, the CDI is averaged over the lifetime (i.e., 70 years). Therefore, the difference between the CDI for noncarcinogenic vs. carcinogenic effects is due to the different methods of time weighting used to estimate the value.
3. A noncancer risk estimate (HQ) of greater than 1 indicates the potential of noncancer effects (e.g., liver disease) to occur in humans exposed at an assumed level and duration to a contaminated medium. A cancer risk level of greater than 1.0e-04 (i.e., one in ten thousand) is above the U.S.EPA's protective risk range for Superfund Sites.
4. Hazard quotient and cancer risks are unitless values which represent the probability of incurring an adverse health effect. These risk values are calculated using the following relationships:
   Hazard Quotient = Chronic Daily Intake / Reference Dose
   Cancer Risk = Chronic Daily Intake x Slope Factor
5. Hazard Quotients and cancer risks are summarized for applicable routes of exposure. Values for each route are summed to arrive at a total exposure pathway risk. The percentage of total risk is also shown for each compound. In some cases, risks were not determined (ND) because a reference dose or slope factor was not available. NA indicates the route is not applicable.

Legend:
EPC = Exposure Point Concentration

Table D-12

EXPOSURE AND HEALTH RISK ESTIMATES

Reasonable Maximum Exposure

Beloit Corporation Remedial Investigation

Rockton, Illinois

Source Area: On-Beloit Corporation Property
Medium: Soil - All Depths

Population: Construction Worker
Land Use: Current Use Scenario

CHEMICAL OF POTENTIAL CONCERN	EPC (mg/kg)	Chronic Daily Intake Values: Noncarcinogenic Dermal	Noncarcinogenic Ingestion	Noncarcinogenic Inhalation	Carcinogenic Dermal	Carcinogenic Ingestion	Carcinogenic Inhalation	Noncancer Hazard Quotients: Dermal Contact	Ingestion	Inhalation	Total	% of Total	Cancer Risks: Dermal Contact	Ingestion	Inhalation	Total	% of Total
VOLATILES																	
Acetone	8 9E-02	9.1E-07	7 5E-08	1 6E-09	1.3E-08	1.1E-09	2 3E-11	9.1E-07	7.5E-08	ND	9.8E-07	0.0	ND	ND	ND	ND	0 0
1,1-Dichloroethane	1 5E-02	4.6E-09	1 3E-08	2.7E-10	6 6E-11	1.8E-10	3.9E-12	4 6E-09	1 3E-08	1 9E-10	1 7E-08	0 0	ND	ND	ND	ND	0 0
2-Butanone	8 0E-03	8 2E-08	6.8E-09	1.5E-10	1.2E-09	9 7E-11	2.1E-12	4 1E-08	3.4E-09	5 1E-11	4 4E-08	0.0	ND	ND	ND	ND	0 0
1,1,1-Trichloroethane	3 0E-03	9 2E-10	2.5E-09	5 5E-11	1.3E-11	3.6E-11	7.9E-13	ND	ND	ND	ND	0 0	ND	ND	ND	ND	0 0
2-Hexanone	4.0E-03	1.2E-09	3.4E-09	7.3E-11	1 8E-11	4.8E-11	1.0E-12	ND	ND	ND	ND	0 0	ND	ND	ND	ND	0 0
Tetrachloroethene	1.6E-01	4.9E-08	1.4E-07	2.9E-09	7.0E-10	1.9E-09	4.2E-11	4.9E-07	1.4E-06	ND	1.8E-06	0 0	3.6E-11	1 0E-10	8 4E-14	1 4E-10	0 0
Toluene	6 0E-03	1.8E-09	5.1E-09	1.1E-10	2 6E-11	7.2E-11	1.6E-12	9.2E-10	2.5E-09	ND	3.5E-09	0.0	ND	ND	ND	ND	0.0
Ethylbenzene	8 0E-03	2.5E-09	6.8E-09	1.5E-10	3.5E-11	9.7E-11	2.1E-12	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0 0
Xylenes (mixed)	2.5E-01	7.7E-08	2.1E-07	4.6E-09	1.1E-09	3 0E-09	6.5E-11	ND	ND	ND	ND	0 0	ND	ND	ND	ND	0 0
SEMIVOLATILES																	
Phenol	1.9E-01	1.9E-06	1 6E-07	3.5E-09	2.8E-08	2.3E-09	5 0E-11	3.2E-06	2.7E-07	ND	3.5E-06	0.0	ND	ND	ND	ND	0 0
2-Methylphenol	1.7E-01	1 7E-06	1.4E-07	3.1E-09	2.5E-08	2.1E-09	4.4E-11	3 5E-06	2.9E-07	ND	3.8E-06	0.0	ND	ND	ND	ND	0 0
4-Methylphenol	5 8E-01	1.8E-07	4 9E-07	1.1E-08	2.5E-09	7.0E-09	1.5E-10	3 6E-05	9.8E-05	ND	1.3E-04	0 0	ND	ND	ND	ND	0.0
2,4-Dimethylphenol	3.9E-01	4 0E-06	3.3E-07	7.1E-09	5.7E-08	4.7E-09	1.0E-10	2.0E-05	1 6E-06	ND	2.2E-05	0.0	ND	ND	ND	ND	0 0
Naphthalene	3.1E+00	0 0E+00	2.6E-06	5.7E-08	0 0E+00	3.7E-08	8 1E-10	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0
2-Methylnaphthalene	2.1E+00	2.1E-07	1.8E-06	3 8E-08	3.1E-09	2 5E-08	5 5E-10	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0 0
Acenaphthene	3.5E+00	0 0E+00	3.0E-06	6 4E-08	0 0E+00	4 2E-08	9.2E-10	4.9E-06	4 9E-06	ND	9.9E-06	0 0	ND	ND	ND	ND	0.0
4-Nitrophenol	1.0E-01	1.0E-06	8 5E-08	1.8E-09	1 5E-08	1.2E-09	2.6E-11	ND	ND	ND	ND	0 0	ND	ND	ND	ND	0 0
Dibenzofuran	1.4E+00	0 0E+00	1.2E-06	2.6E-08	0.0E+00	1.7E-08	3.7E-10	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0 0
Fluorene	2.5E+00	0 0E+00	2.1E-06	4.6E-08	0.0E+00	3 0E-08	6.5E-10	5.3E-06	5 3E-06	ND	1.1E-05	0.0	ND	ND	ND	ND	0.0
Phenanthrene	2.7E+01	0.0E+00	2.3E-05	4.9E-07	0.0E+00	3.3E-07	7.1E-09	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0 0
Anthracene	4 8E+00	0.0E+00	4.1E-06	8 8E-08	0.0E+00	5.8E-08	1.3E-09	1.4E-06	1.4E-06	ND	2.7E-06	0.0	ND	ND	ND	ND	0.0
Fluoranthene	5.7E+01	0 0E+00	4.8E-05	1.0E-06	0.0E+00	6.9E-07	1.5E-08	1.2E-04	1.2E-04	ND	2.4E-04	0.1	ND	ND	ND	ND	0 0
Pyrene	5 1E+01	0.0E+00	4.3E-05	9.3E-07	0.0E+00	6.2E-07	1.3E-08	1.4E-04	1.4E-04	ND	2 9E-04	0.1	ND	ND	ND	ND	0 0
Benzo(a)anthracene	5.6E+01	0.0E+00	4.7E-05	1.0E-06	0.0E+00	6.8E-07	1.5E-08	ND	ND	ND	ND	0.0	4.9E-07	4.9E-07	4.5E-09	9.9E-07	5 6
Chrysene	5.4E+01	0.0E+00	4.6E-05	9.9E-07	0.0E+00	6.5E-07	1.4E-08	ND	ND	ND	ND	0.0	4.8E-09	4.8E-09	4.4E-11	9 6E-09	0.1
bis(2-ethylhexyl)phthalate	2.1E+00	2.1E-05	1.8E-06	3 8E-08	3.1E-07	2.5E-08	5.5E-10	ND	ND	ND	ND	0.0	4 3E-09	3 6E-10	7.7E-12	4 7E-09	0 0
Di-n-octyl Phthalate	1.5E-01	1.5E-06	1.3E-07	2.7E-09	2.2E-08	1.8E-09	3.9E-11	7.7E-05	6 3E-06	ND	8 3E-05	0 0	ND	ND	ND	ND	0.0
Benzo(b)fluoranthene	1 3E+02	0.0E+00	1.1E-04	2.4E-06	0 0E+00	1.6E-06	3.4E-08	ND	ND	ND	ND	0 0	1.1E-06	1.1E-06	1.1E-08	2 3E-06	13 0
Benzo(k)fluoranthene	1 3E+02	0 0E+00	1.1E-04	2 4E-06	0 0E+00	1 6E-06	3.4E-08	ND	ND	ND	ND	0.0	1.1E-07	1.1E-07	1.1E-09	2.3E-07	1.3
Benzo(a)pyrene	5 7E+01	0 0E+00	4.8E-05	1.0E-06	0 0E+00	6 9E-07	1.5E-08	ND	ND	ND	ND	0 0	5.0E-06	5.0E-06	4.6E-08	1.0E-05	57.2
Ideno(1,2,3-cd)pyrene	5.7E+01	0 0E+00	4.8E-05	1 0E-06	0.0E+00	6 9E-07	1 5E-08	ND	ND	ND	ND	0.0	5 0E-07	5.0E-07	4 6E-09	1.0E-06	5 7
Dibenz(a,h)anthracene	9.2E+00	0.0E+00	7.8E-06	1.7E-07	0.0E+00	1.1E-07	2.4E-09	ND	ND	ND	ND	0.0	8.1E-07	8.1E-07	7.5E-09	1.6E-06	9 2
Benzo(g,h,i)perylene	7 3E+01	0.0E+00	6.2E-05	1.3E-06	0.0E+00	8.8E-07	1.9E-08	ND	ND	ND	ND	0 0	ND	ND	ND	ND	0 0
Carbazole	2.5E+00	0.0E+00	2 1E-06	4.6E-08	0.0E+00	3.0E-08	6.5E-10	ND	ND	ND	ND	0.0	ND	6 0E-10	ND	6.0E-10	0 0

Table D-12

EXPOSURE AND HEALTH RISK ESTIMATES

Reasonable Maximum Exposure

Beloit Corporation Remedial Investigation

Rockton, Illinois

Source Area: On-Beloit Corporation Property
Medium: Soil - All Depths

Population: Construction Worker
Land Use: Current Use Scenario

CHEMICAL OF POTENTIAL CONCERN	EPC (mg/kg)	Chronic Daily Intake Values: Noncarcinogenic Dermal	Noncarcinogenic Ingestion	Noncarcinogenic Inhalation	Carcinogenic Dermal	Carcinogenic Ingestion	Carcinogenic Inhalation	Noncancer Hazard Quotients: Dermal Contact	Ingestion	Inhalation	Total	% of Total	Cancer Risks: Dermal Contact	Ingestion	Inhalation	Total	% of Total
PESTICIDE/PCB																	
Heptachlor	1 0E-03	3 1E-10	8.5E-10	1.8E-11	4 4E-12	1.2E-11	2 6E-13	6 1E-07	1.7E-06	ND	2 3E-06	0.0	2 0E-11	5.4E-11	1.2E-12	7.5E-11	0 0
Aldrin	1 8E-03	1.8E-08	1.5E-09	3.3E-11	2.6E-10	2 2E-11	4.7E-13	6.1E-04	5.1E-05	ND	6 6E-04	0.2	4.5E-09	3.7E-10	8.1E-12	4.9E-09	0 0
4,4'-DDT	4.1E-03	1.3E-09	3.5E-09	7.5E-11	1.8E-11	5.0E-11	1 1E-12	2.5E-06	6 9E-06	ND	9 4E-06	0.0	6 1E-12	1 7E-11	3.6E-13	2 3E-11	0 0
Methoxychlor	1 5E-01	1.5E-06	1.3E-07	2.7E-09	2.2E-08	1.8E-09	3 9E-11	3 1E-04	2 5E-05	ND	3.3E-04	0.1	ND	ND	ND	ND	0.0
Endrin ketone	2.5E-02	1.0E-07	2.1E-08	4.6E-10	1.5E-09	3.0E-10	6.5E-12	3.4E-04	7.0E-05	ND	4.1E-04	0.1	ND	ND	ND	ND	0 0
PCB	3.6E-01	2 2E-07	3.0E-07	6.6E-09	3.2E-09	4.3E-09	9.4E-11	ND	ND	ND	ND	0.0	6 3E-09	8.7E-09	1.9E-10	1 5E-08	0.1
METALS																	
Aluminum	1.3E+04	1 3E-03	1 1E-02	2.4E-04	1.9E-05	1.6E-04	3.4E-06	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0 0
Antimony	1.2E+01	1.2E-06	1.0E-05	2.2E-07	1.7E-08	1 4E-07	3.1E-09	2.0E-02	2.5E-02	ND	4.5E-02	13.2	ND	ND	ND	ND	0.0
Arsenic	1.1E+01	1.1E-06	9.0E-06	2 0E-07	1.6E-08	1.3E-07	2.8E-09	3.6E-03	3 0E-02	ND	3.4E-02	9.9	2.3E-08	1 9E-07	4 2E-08	2.6E-07	1 5
Barium	1.3E+02	1 3E-05	1.1E-04	2.3E-06	1.9E-07	1 5E-06	3.3E-08	2.7E-03	1.5E-03	1.6E-03	5 9E-03	1.7	ND	ND	ND	ND	0 0
Beryllium	1.1E+00	1.1E-07	9 3E-07	2.0E-08	1 6E-09	1 3E-08	2 9E-10	3 2E-03	1.9E-04	ND	3 4E-03	1 0	ND	ND	2 4E-09	2 4E-09	0 0
Cadmium (food/soil)	1 2E+01	1 2E-06	9.7E-06	2.1E-07	1.7E-08	1 4E-07	3 0E-09	ND	ND	ND	ND	0.0	ND	ND	1 9E-08	1.9E-08	0 1
Chromium III	7 3E+01	7 5E-06	6 2E-05	1.3E-06	1.1E-07	8.9E-07	1.9E-08	1 9E-04	6 2E-05	6.7E-02	6 7E-02	19.8	ND	ND	ND	ND	0 0
Chromium VI	1.0E+02	1.0E-05	8.5E-05	1.8E-06	1.5E-07	1.2E-06	2 6E-08	2.0E-02	4 2E-03	ND	2.5E-02	7.3	ND	ND	1 1E-06	1 1E-06	6 1
Cobalt	1.7E+01	1.7E-06	1.4E-05	3.1E-07	2 5E-08	2.0E-07	4 4E-09	ND	ND	ND	ND	0 0	ND	ND	ND	ND	0 0
Copper	1.6E+03	1 6E-04	1 3E-03	2 8E-05	2 3E-06	1.9E-05	4.1E-07	1 4E-02	3.5E-02	ND	5 0E-02	14 6	ND	ND	ND	ND	0 0
Lead	8.3E+02	8 4E-05	7.0E-04	1.5E-05	1.2E-06	1.0E-05	2 2E-07	ND	ND	ND	ND	0 0	ND	ND	ND	ND	0.0
Manganese	1.4E+03	1 4E-04	1.2E-03	2.6E-05	2.0E-06	1.7E-05	3.7E-07	2 6E-02	8 5E-03	ND	3 4E-02	10.0	ND	ND	ND	ND	0.0
Mercury	6 6E-01	6.7E-08	5.6E-07	1.2E-08	9 6E-10	8.0E-09	1.7E-10	2 2E-04	1.9E-03	1 4E-04	2.2E-03	0.7	ND	ND	ND	ND	0 0
Nickel	2 7E+02	2 7E-05	2.3E-04	4 9E-06	3.9E-07	3 2E-06	7.0E-08	3.4E-02	1.1E-02	ND	4 6E-02	13 4	ND	ND	ND	ND	0 0
Selenium	7 1E-01	7.3E-08	6.0E-07	1.3E-08	1.0E-09	8 6E-09	1 9E-10	1.5E-05	1 2E-04	ND	1.3E-04	0 0	ND	ND	ND	ND	0 0
Vanadium	3.7E+01	3.7E-06	3.1E-05	6.7E-07	5.3E-08	4 4E-07	9.6E-09	2 0E-02	4 4E-03	ND	2 5E-02	7.3	ND	ND	ND	ND	0 0
Zinc	3.1E+02	3 2E-05	2.6E-04	5.7E-06	4.5E-07	3.8E-06	8 1E-08	1.1E-04	8.8E-04	ND	9.8E-04	0.3	ND	ND	ND	ND	0 0
Cyanide	9.4E-01	2.9E-08	7.9E-07	1.7E-08	4.1E-10	1.1E-08	2.5E-10	1.4E-06	4.0E-05	ND	4 1E-05	0.0	ND	ND	ND	ND	0 0
						Total Risks.		1.5E-01	1 2E-01	6.9E-02	3 4E-01	100 0	8.1E-06	8.3E-06	1 2E-06	1.8E-05	100 0

Notes.

1. Adsorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium. It should be noted that consistent with IEPA guidance (IEPA 1994), dermal absorbed doses were not estimated for the PAHs presented above. Rather, the risk associated with PAHs was assessed by doubling the oral risk value.

2. For noncarcinogenic effects, the chronic daily intake (CDI) is averaged over the exposure period; whereas for carcinogenic effects, the CDI is averaged over the lifetime (i e , 70 years). Therefore, the difference between the CDI for noncarcinogenic vs carcinogenic effects is due to the different methods of time weighting used to estimate the value.

3. A noncancer risk estimate (HQ) of greater than 1 indicates the potential of noncancer effects (e g , liver disease) to occur in humans exposed at an assumed level and duration to a contaminated medium. A cancer risk level of greater than 1 0e-04 (i e , one in ten thousand) is above the U.S EPA's protective risk range for Superfund Sites.

4. Hazard quotient and cancer risks are unitless values which represent the probability of incurring an adverse health effect. These risk values are calculated using the following relationships.

   Hazard Quotient = Chronic Daily Intake / Reference Dose

   Cancer Risk = Chronic Daily Intake x Slope Factor

5. Hazard Quotients and cancer risks are summarized for applicable routes of exposure. Values for each route are summed to arrive at a total exposure pathway risk. The percentage of total risk is also shown for each compound. In some cases, risks were not determined (ND) because a reference dose or slope factor was not available. NA indicates the route is not applicable.

Legend

EPC = Exposure Point Concentration

Table D-13

EXPOSURE AND HEALTH RISK ESTIMATES
Maximum Reasonable Exposure

Beloit Corporation Remedial Investigation
Rockton, Illinois

Source Area: Groundwater
Medium: Private well water

Population: Rockton Resident (see note 1 below)
Land Use: Hypothetical Future Use Scenario

CHEMICAL OF POTENTIAL CONCERN	EPC (mg/L)	Chronic Daily Intake Values: Noncarcinogenic Dermal	Noncarcinogenic Ingestion	Noncarcinogenic Inhalation	Carcinogenic Dermal	Carcinogenic Ingestion	Carcinogenic Inhalation	Noncancer Hazard Quotients: Dermal Contact	Ingestion	Inhalation	Total	% of Total	Cancer Risks: Dermal Contact	Ingestion	Inhalation	Total	% of Total
VOLATILES																	
1,1-Dichloroethene	3.0E-03	1.8E-06	9.8E-05	3.2E-04	7.7E-07	4.2E-05	1.4E-04	2.0E-04	1.1E-02	ND	1.1E-02	0.6	4.6E-07	2.5E-05	1.7E-04	1.9E-04	67.9
1,1-Dichloroethane	1.2E-02	3.8E-06	3.9E-04	1.3E-03	1.6E-06	1.7E-04	5.5E-04	3.8E-05	3.9E-03	9.0E-03	1.3E-02	0.7	ND	ND	ND	ND	0.0
1,1,1-Trichloroethane	1.9E-02	1.2E-05	6.2E-04	2.0E-03	5.2E-06	2.6E-04	8.8E-04	6.0E-04	3.1E-02	7.2E-03	3.9E-02	2.2	ND	ND	ND	ND	0.0
Carbon tetrachloride	3.0E-03	0.0E+00	9.8E-05	3.2E-04	0.0E+00	4.2E-05	1.4E-04	ND	1.4E-01	5.7E-01	7.1E-01	40.0	ND	5.4E-06	7.3E-06	1.3E-05	4.5
Trichloroethene	1.8E-01	1.1E-04	5.9E-03	1.9E-02	4.6E-05	2.5E-03	8.3E-03	1.8E-02	9.8E-01	ND	9.9E-01	56.4	5.1E-07	2.8E-05	5.0E-05	7.8E-05	27.6
						Total Risks:		1.9E-02	1.2E+00	5.8E-01	1.8E+00	100.0	9.7E-07	5.8E-05	2.2E-04	2.8E-04	100.0

Notes:

1. This table summarizes the potential risks for residences in the Village of Rockton that obtain their drinking water from private wells, assuming hypothically that their wells become contaminated in the future. The highest concentrations of constituents ever detected in monitoring well W47C (which is upgradient of Rockton) were used to represent the potential concentrations at these residences.
2. Adsorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.
3. For noncarcinogenic effects, the chronic daily intake (CDI) is averaged over the exposure period; whereas for carcinogenic effects, the CDI is averaged over the lifetime (i.e., 70 years). Therefore, the difference between the CDI for noncarcinogenic vs. carcinogenic effects is due to the different methods of time weighting used to estimate the value.
3. A noncancer risk estimate (HQ) of greater than 1 indicates the potential of noncancer effects (e.g., liver disease) to occur in humans exposed at an assumed level and duration to a contaminated medium. A cancer risk level of greater than 1.0e-04 (i.e., one in ten thousand) is above the U.S.EPA's protective risk range for Superfund Sites.
5. Hazard quotient and cancer risks are unitless values which represent the probability of incurring an adverse health effect. These risk values are calculated using the following relationships:
   Hazard Quotient = Chronic Daily Intake / Reference Dose
   Cancer Risk = Chronic Daily Intake x Slope Factor
6. Hazard Quotients and cancer risks are summarized for applicable routes of exposure. Values for each route are summed to arrive at a total exposure pathway risk. The percentage of total risk is also shown for each compound. In some cases, risks were not determined (ND) because a reference dose or slope factor was not available. NA indicates the route is not applicable.

Legend:
EPC = Exposure Point Concentration

Table D-14

EXPOSURE AND HEALTH RISK ESTIMATES
Reasonable Maximum Exposure

Beloit Corporation Remedial Investigation
Rockton, Illinois

Source Area: On-Beloit Corporation Property
Medium: Surface Soil
Population: Future Potential Site Employees
Land Use: Future Use Scenario

CHEMICAL OF POTENTIAL CONCERN	EPC (mg/kg)	Chronic Daily Intake Values: Noncarcinogenic Dermal	Noncarcinogenic Ingestion	Noncarcinogenic Inhalation	Carcinogenic Dermal	Carcinogenic Ingestion	Carcinogenic Inhalation	Noncancer Hazard Quotients: Dermal Contact	Ingestion	Inhalation	Total	% of Total	Cancer Risks: Dermal Contact	Ingestion	Inhalation	Total	% of Total
VOLATILES																	
Acetone	8.9E-02	1.3E-06	1.1E-08	2.5E-09	4.5E-07	3.9E-09	9.1E-10	1.3E-05	1.1E-07	ND	1.3E-05	0.0	ND	ND	ND	ND	0.0
Tetrachloroethene	8.0E-03	3.4E-09	9.8E-10	2.3E-10	1.2E-09	3.5E-10	8.1E-11	3.4E-07	9.8E-08	1.6E-09	4.4E-07	0.0	6.3E-11	1.8E-11	1.6E-13	8.2E-11	0.0
Toluene	6.0E-03	2.6E-09	7.3E-10	1.7E-10	9.1E-10	2.6E-10	6.1E-11	1.3E-08	3.7E-09	1.5E-09	1.8E-08	0.0	ND	ND	ND	ND	0.0
SEMIVOLATILES																	
Acenaphthene	2.3E-01	0.0E+00	2.8E-08	6.6E-09	0.0E+00	1.0E-08	2.3E-09	4.7E-07	4.7E-07	ND	9.4E-07	0.0	ND	ND	ND	ND	0.0
4-Nitrophenol	1.0E-01	1.4E-06	1.2E-08	2.8E-09	5.1E-07	4.4E-09	1.0E-09	1.8E-04	1.5E-06	ND	1.8E-04	0.0	ND	ND	ND	ND	0.0
Dibenzofuran	9.5E-02	0.0E+00	1.2E-08	2.7E-09	0.0E+00	4.1E-09	9.7E-10	2.9E-06	2.9E-06	ND	5.8E-06	0.0	ND	ND	ND	ND	0.0
Fluorene	1.9E-01	0.0E+00	2.3E-08	5.4E-09	0.0E+00	8.3E-09	1.9E-09	5.8E-07	5.8E-07	ND	1.2E-06	0.0	ND	ND	ND	ND	0.0
Phenanthrene	1.6E+00	0.0E+00	2.0E-07	4.6E-08	0.0E+00	7.0E-08	1.6E-08	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0
Anthracene	4.6E-01	0.0E+00	5.6E-08	1.3E-08	0.0E+00	2.0E-08	4.7E-09	1.9E-07	1.9E-07	ND	3.8E-07	0.0	ND	ND	ND	ND	0.0
Fluoranthene	2.5E+00	0.0E+00	3.1E-07	7.1E-08	0.0E+00	1.1E-07	2.5E-08	7.6E-06	7.6E-06	ND	1.5E-05	0.0	ND	ND	ND	ND	0.0
Pyrene	1.8E+00	0.0E+00	2.2E-07	5.1E-08	0.0E+00	7.9E-08	1.8E-08	7.3E-06	7.3E-06	ND	1.5E-05	0.0	ND	ND	ND	ND	0.0
Benzo(a)anthracene	1.0E+00	0.0E+00	1.2E-07	2.8E-08	0.0E+00	4.4E-08	1.0E-08	ND	ND	ND	ND	0.0	3.2E-08	3.2E-08	3.2E-09	6.7E-08	0.2
Chrysene	1.4E+00	0.0E+00	1.7E-07	4.0E-08	0.0E+00	6.1E-08	1.4E-08	ND	ND	ND	ND	0.0	4.5E-10	4.5E-10	4.4E-11	9.4E-10	0.0
bis(2-ethylhexyl)phthalate	2.1E-01	3.0E-06	2.6E-08	6.0E-09	1.1E-06	9.2E-09	2.1E-09	1.5E-04	1.3E-06	ND	1.5E-04	0.0	1.5E-08	1.3E-10	3.0E-11	1.5E-08	0.0
Di-n-octyl Phthalate	1.5E-01	2.1E-06	1.8E-08	4.3E-09	7.6E-07	6.6E-09	1.5E-09	1.1E-04	9.2E-07	ND	1.1E-04	0.0	ND	ND	ND	ND	0.0
Benzo(b)fluoranthene	1.7E+00	0.0E+00	2.1E-07	4.8E-08	0.0E+00	7.4E-08	1.7E-08	ND	ND	ND	ND	0.0	5.4E-08	5.4E-08	5.4E-09	1.1E-07	0.3
Benzo(k)fluoranthene	1.7E+00	0.0E+00	2.1E-07	4.8E-08	0.0E+00	7.4E-08	1.7E-08	ND	ND	ND	ND	0.0	5.4E-09	5.4E-09	5.4E-10	1.1E-08	0.0
Benzo(a)pyrene	1.0E+00	0.0E+00	1.2E-07	2.8E-08	0.0E+00	4.4E-08	1.0E-08	ND	ND	ND	ND	0.0	3.2E-07	3.2E-07	3.2E-08	6.7E-07	2.0
Ideno(1,2,3-cd)pyrene	7.0E-01	0.0E+00	8.6E-08	2.0E-08	0.0E+00	3.1E-08	7.1E-09	ND	ND	ND	ND	0.0	2.2E-08	2.2E-08	2.2E-09	4.7E-08	0.1
Dibenz(a,h)anthracene	1.1E-01	0.0E+00	1.3E-08	3.1E-09	0.0E+00	4.8E-09	1.1E-09	ND	ND	ND	ND	0.0	3.5E-08	3.5E-08	3.5E-09	7.4E-08	0.2
Benzo(g,h,i)perylene	7.7E-01	0.0E+00	9.4E-08	2.2E-08	0.0E+00	3.4E-08	7.8E-09	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0
Carbazole	1.9E-01	0.0E+00	2.3E-08	5.4E-09	0.0E+00	8.3E-09	1.9E-09	ND	ND	ND	ND	0.0	ND	1.7E-10	ND	1.7E-10	0.0
PESTICIDE/PCB																	
Aldrin	1.8E-03	2.6E-08	2.2E-10	5.1E-11	9.1E-09	7.9E-11	1.8E-11	8.5E-04	7.3E-06	ND	8.6E-04	0.0	1.6E-07	1.3E-09	3.1E-10	1.6E-07	0.5
4,4'-DDT	3.2E-03	1.4E-09	3.9E-10	9.1E-11	4.9E-10	1.4E-10	3.3E-11	2.7E-06	7.8E-07	ND	3.5E-06	0.0	1.7E-10	4.8E-11	1.1E-11	2.2E-10	0.0
PCB	3.6E-01	3.1E-07	4.4E-08	1.0E-08	1.1E-07	1.6E-08	3.7E-09	1.5E-02	2.2E-03	ND	1.8E-02	0.8	2.2E-07	3.1E-08	7.3E-09	2.6E-07	0.8

Table D-14

EXPOSURE AND HEALTH RISK ESTIMATES
Reasonable Maximum Exposure

Beloit Corporation Remedial Investigation
Rockton, Illinois

Source Area: On-Beloit Corporation Property
Medium: Surface Soil
Population: Future Potential Site Employees
Land Use: Future Use Scenario

CHEMICAL OF POTENTIAL CONCERN	EPC (mg/kg)	Chronic Daily Intake Values: Noncarcinogenic Dermal	Noncarcinogenic Ingestion	Noncarcinogenic Inhalation	Carcinogenic Dermal	Carcinogenic Ingestion	Carcinogenic Inhalation	Noncancer Hazard Quotients: Dermal Contact	Ingestion	Inhalation	Total	% of Total	Cancer Risks: Dermal Contact	Ingestion	Inhalation	Total	% of Total
METALS																	
Aluminum	1.3E+04	1.8E-03	1.6E-03	3.7E-04	6.5E-04	5.6E-04	1.3E-04	1.8E-02	1.6E-03	3.7E-01	3.9E-01	17.7	ND	ND	ND	ND	0.0
Antimony	8.7E+00	1.2E-06	1.1E-06	2.5E-07	4.4E-07	3.8E-07	8.9E-08	2.1E-02	2.7E-03	ND	2.3E-02	1.1	ND	ND	ND	ND	0.0
Arsenic	5.1E+00	7.2E-07	6.2E-07	1.5E-07	2.6E-07	2.2E-07	5.2E-08	2.4E-03	2.1E-03	ND	4.5E-03	0.2	3.9E-07	3.3E-07	7.8E-07	1.5E-06	4.4
Barium	1.3E+02	1.8E-05	1.6E-05	3.6E-06	6.5E-06	5.6E-06	1.3E-06	3.7E-03	2.2E-04	2.6E-02	3.0E-02	1.4	ND	ND	ND	ND	0.0
Beryllium	6.2E-01	8.8E-08	7.6E-08	1.8E-08	3.1E-08	2.7E-08	6.3E-09	6.3E-03	3.8E-05	3.1E-03	9.4E-03	0.4	ND	ND	5.3E-08	5.3E-08	0.2
Cadmium (water)	4.3E+00	6.1E-07	5.3E-07	1.2E-07	2.2E-07	1.9E-07	4.4E-08	4.9E-02	1.1E-03	2.1E-03	5.2E-02	2.4	ND	ND	2.8E-07	2.8E-07	0.8
Chromium VI	7.3E+01	1.0E-05	9.0E-06	2.1E-06	3.7E-06	3.2E-06	7.5E-07	1.4E-01	3.0E-03	7.3E-02	2.2E-01	9.8	ND	ND	3.1E-05	3.1E-05	90.4
Cobalt	8.1E+00	1.1E-06	9.9E-07	2.3E-07	4.1E-07	3.5E-07	8.2E-08	1.9E-05	1.7E-05	ND	3.6E-05	0.0	ND	ND	ND	ND	0.0
Copper	1.6E+03	2.2E-04	1.9E-04	4.4E-05	7.9E-05	6.8E-05	1.6E-05	2.0E-02	5.1E-03	ND	2.5E-02	1.1	ND	ND	ND	ND	0.0
Lead	8.3E+02	1.2E-04	1.0E-04	2.4E-05	4.2E-05	3.6E-05	8.4E-06	ND	ND	ND	ND	0.0	ND	ND	ND	ND	0.0
Manganese	6.8E+02	9.7E-05	8.3E-05	1.9E-05	3.5E-05	3.0E-05	6.9E-06	1.7E-02	5.9E-04	1.4E+00	1.4E+00	63.0	ND	ND	ND	ND	0.0
Mercury	3.9E-01	5.5E-08	4.8E-08	1.1E-08	2.0E-08	1.7E-08	4.0E-09	1.8E-04	1.6E-04	1.3E-04	4.7E-04	0.0	ND	ND	ND	ND	0.0
Nickel	6.6E+01	9.3E-06	8.1E-06	1.9E-06	3.3E-06	2.9E-06	6.7E-07	1.2E-02	4.0E-04	ND	1.2E-02	0.6	ND	ND	ND	ND	0.0
Selenium	7.1E-01	1.0E-07	8.7E-08	2.0E-08	3.6E-08	3.1E-08	7.2E-09	2.0E-05	1.7E-05	ND	3.8E-05	0.0	ND	ND	ND	ND	0.0
Silver	2.9E+00	4.1E-07	3.5E-07	8.3E-08	1.5E-07	1.3E-07	3.0E-08	2.1E-03	7.1E-05	ND	2.1E-03	0.1	ND	ND	ND	ND	0.0
Vanadium	3.7E+01	5.2E-06	4.5E-06	1.0E-06	1.8E-06	1.6E-06	3.7E-07	2.8E-02	6.4E-04	ND	2.9E-02	1.3	ND	ND	ND	ND	0.0
Zinc	1.3E+02	1.8E-05	1.6E-05	3.7E-06	6.6E-06	5.7E-06	1.3E-06	6.1E-05	5.3E-05	ND	1.1E-04	0.0	ND	ND	ND	ND	0.0
Cyanide	9.4E-01	1.3E-07	1.1E-07	2.7E-08	4.8E-08	4.1E-08	9.6E-09	6.7E-06	5.7E-06	ND	1.2E-05	0.0	ND	ND	ND	ND	0.0
					Total Risks:			3.4E-01	2.0E-02	1.8E+00	2.2E+00	100.0	1.2E-06	8.4E-07	3.2E-05	3.4E-05	100.0

Notes:

1. Adsorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium. It should be noted that consistent with IEPA guidance (IEPA 1994), dermal absorbed doses were not estimated for the PAHs presented above. Rather, the risk associated with PAHs was assessed by doubling the oral risk value.
2. For noncarcinogenic effects, the chronic daily intake (CDI) is averaged over the exposure period; whereas for carcinogenic effects, the CDI is averaged over the lifetime (i.e., 70 years). Therefore, the difference between the CDI for noncarcinogenic vs. carcinogenic effects is due to the different methods of time weighting used to estimate the value.
3. A noncancer risk estimate (HQ) of greater than 1 indicates the potential of noncancer effects (e.g., liver disease) to occur in humans exposed at an assumed level and duration to a contaminated medium. A cancer risk level of greater than 1.0e-04 (i.e., one in ten thousand) is above the U.S.EPA's protective risk range for Superfund Sites.
4. Hazard quotient and cancer risks are unitless values which represent the probability of incurring an adverse health effect. These risk values are calculated using the following relationships:
   Hazard Quotient = Chronic Daily Intake / Reference Dose
   Cancer Risk = Chronic Daily Intake x Slope Factor
5. Hazard Quotients and cancer risks are summarized for applicable routes of exposure. Values for each route are summed to arrive at a total exposure pathway risk. The percentage of total risk is also shown for each compound. In some cases, risks were not determined (ND) because a reference dose or slope factor was not available. NA indicates the route is not applicable.

Legend:

Table D-15

EXPOSURE AND HEALTH RISK ESTIMATES
Reasonable Maximum Exposure

Beloit Corporation Remedial Investigation
Rockton, Illinois

Source Area: Rock River
Medium: Sediment - High (includes SD07 PAH results)

Population: Hypothetical Recreational Users
Land Use: Current Use Scenario

CHEMICAL OF POTENTIAL CONCERN	EPC (mg/kg)	Chronic Daily Intake Values: Noncarcinogenic Dermal	Noncarcinogenic Ingestion	Noncarcinogenic Inhalation	Carcinogenic Dermal	Carcinogenic Ingestion	Carcinogenic Inhalation	Noncancer Hazard Quotients: Dermal Contact	Ingestion	Inhalation	Total	% of Total	Cancer Risks: Dermal Contact	Ingestion	Inhalation	Total	% of Total
VOLATILES																	
Acetone	1.6E-01	3.6E-06	7.7E-08	NA	5.2E-07	1.1E-08	NA	3.6E-05	7.7E-07	NA	3.7E-05	0.0	ND	ND	NA	ND	0.0
2-Butanone	3.6E-02	8.1E-07	1.7E-08	NA	1.2E-07	2.5E-09	NA	1.4E-06	2.9E-08	NA	1.4E-06	0.0	ND	ND	NA	ND	0.0
Ethylbenzene	1.5E-01	1.0E-07	7.2E-08	NA	1.4E-08	1.0E-08	NA	1.0E-06	7.2E-07	NA	1.7E-06	0.0	ND	ND	NA	ND	0.0
Xylenes (mixed)	1.1E-01	7.4E-08	5.3E-08	NA	1.1E-08	7.5E-09	NA	3.7E-08	2.6E-08	NA	6.4E-08	0.0	ND	ND	NA	ND	0.0
SEMIVOLATILES																	
4-Methylphenol	*1.1E-01*	*7.4E-08*	*5.3E-08*	NA	*1.1E-08*	*7.5E-09*	NA	*1.5E-05*	*1.1E-05*	NA	*2.5E-05*	*0.0*	*ND*	*ND*	NA	*ND*	*0.0*
Naphthalene	2.4E+01	0.0E+00	1.2E-05	NA	0.0E+00	1.6E-06	NA	ND	5.8E-04	NA	5.8E-04	0.4	ND	ND	NA	ND	0.0
2-Methylnaphthalene	4.8E+01	1.1E-05	2.3E-05	NA	1.5E-06	3.3E-06	NA	5.4E-04	1.2E-03	NA	1.7E-03	1.0	ND	ND	NA	ND	0.0
Acenaphthylene	7.6E+00	0.0E+00	3.6E-06	NA	0.0E+00	5.2E-07	NA	ND	ND	NA	ND	0.0	ND	ND	NA	ND	0.0
Acenaphthene	4.0E+01	0.0E+00	1.9E-05	NA	0.0E+00	2.7E-06	NA	ND	3.2E-04	NA	3.2E-04	0.2	ND	ND	NA	ND	0.0
Dibenzofuran	7.4E+00	0.0E+00	3.5E-06	NA	0.0E+00	5.1E-07	NA	ND	8.9E-04	NA	8.9E-04	0.5	ND	ND	NA	ND	0.0
Fluorene	2.7E+01	0.0E+00	1.3E-05	NA	0.0E+00	1.8E-06	NA	ND	3.2E-04	NA	3.2E-04	0.2	ND	ND	NA	ND	0.0
Phenanthrene	1.0E+02	0.0E+00	4.8E-05	NA	0.0E+00	6.8E-06	NA	ND	ND	NA	ND	0.0	ND	ND	NA	ND	0.0
Anthracene	4.2E+01	0.0E+00	2.0E-05	NA	0.0E+00	2.9E-06	NA	ND	6.7E-05	NA	6.7E-05	0.0	ND	ND	NA	ND	0.0
Di-n-butylphthalate	3.1E-01	7.0E-06	1.5E-07	NA	1.0E-06	2.1E-08	NA	7.0E-05	1.5E-06	NA	7.1E-05	0.0	ND	ND	NA	ND	0.0
Fluoranthene	6.4E+01	0.0E+00	3.1E-05	NA	0.0E+00	4.4E-06	NA	ND	7.7E-04	NA	7.7E-04	0.5	ND	ND	NA	ND	0.0
Pyrene	8.4E+01	0.0E+00	4.0E-05	NA	0.0E+00	5.8E-06	NA	ND	1.3E-03	NA	1.3E-03	0.8	ND	ND	NA	ND	0.0
Benzo(a)anthracene	3.8E+01	0.0E+00	1.8E-05	NA	0.0E+00	2.6E-06	NA	ND	ND	NA	ND	0.0	1.9E-06	1.9E-06	NA	3.8E-06	8.7
Chrysene	3.5E+01	0.0E+00	1.7E-05	NA	0.0E+00	2.4E-06	NA	ND	ND	NA	ND	0.0	1.8E-08	1.8E-08	NA	3.5E-08	0.1
Benzo(b)fluoranthene	2.0E+01	0.0E+00	9.6E-06	NA	0.0E+00	1.4E-06	NA	ND	ND	NA	ND	0.0	1.0E-06	1.0E-06	NA	2.0E-06	4.6
Benzo(k)fluoranthene	1.7E+01	0.0E+00	8.2E-06	NA	0.0E+00	1.2E-06	NA	ND	ND	NA	ND	0.0	8.5E-08	8.5E-08	NA	1.7E-07	0.4
Benzo(a)pyrene	3.0E+01	0.0E+00	1.4E-05	NA	0.0E+00	2.1E-06	NA	ND	ND	NA	ND	0.0	1.5E-05	1.5E-05	NA	3.0E-05	68.6
Ideno(1,2,3-cd)pyrene	1.0E+01	0.0E+00	4.8E-06	NA	0.0E+00	6.8E-07	NA	ND	ND	NA	ND	0.0	5.0E-07	5.0E-07	NA	1.0E-06	2.3
Dibenz(a,h)anthracene	5.6E+00	0.0E+00	2.7E-06	NA	0.0E+00	3.8E-07	NA	ND	ND	NA	ND	0.0	2.8E-06	2.8E-06	NA	5.6E-06	12.8
Benzo(g,h,i)perylene	1.2E+01	0.0E+00	5.8E-06	NA	0.0E+00	8.2E-07	NA	ND	ND	NA	ND	0.0	ND	ND	NA	ND	0.0
PESTICIDE/PCB																	
METALS																	
Aluminum	1.1E+04	2.4E-03	5.1E-03	NA	3.4E-04	7.3E-04	NA	2.4E-02	5.1E-03	NA	2.9E-02	17.8	ND	ND	NA	ND	0.0
Arsenic	7.3E+00	1.6E-06	3.5E-06	NA	2.4E-07	5.0E-07	NA	5.5E-03	1.2E-02	NA	1.7E-02	10.6	3.5E-07	7.5E-07	NA	1.1E-06	2.5
Barium	1.7E+02	3.7E-05	8.0E-05	NA	5.3E-06	1.1E-05	NA	7.6E-03	1.1E-03	NA	8.8E-03	5.4	ND	ND	NA	ND	0.0

Table D-15

EXPOSURE AND HEALTH RISK ESTIMATES
Reasonable Maximum Exposure

Beloit Corporation Remedial Investigation
Rockton, Illinois

Source Area: Rock River
Medium: Sediment - High (includes SD07 PAH results)

Population: Hypothetical Recreational Users
Land Use: Current Use Scenario

		Chronic Daily Intake Values						Noncancer Hazard Quotients					Cancer Risks				
		Noncarcinogenic			Carcinogenic			Dermal				% of	Dermal				% of
CHEMICAL OF POTENTIAL CONCERN	EPC (mg/kg)	Dermal	Ingestion	Inhalation	Dermal	Ingestion	Inhalation	Contact	Ingestion	Inhalation	Total	Total	Contact	Ingestion	Inhalation	Total	Total
Cadmium (food/soil)	3.9E+00	8.8E-07	1.9E-06	NA	1.3E-07	2.7E-07	NA	1.8E-02	1.9E-03	NA	1.9E-02	12.0	ND	ND	NA	ND	0.0
Calcium	8.4E+04	1.9E-02	4.0E-02	NA	2.7E-03	5.7E-03	NA	ND	ND	NA	ND	0.0	ND	ND	NA	ND	0.0
Chromium III	1.8E+01	3.9E-06	8.4E-06	NA	5.6E-07	1.2E-06	NA	9.9E-05	8.4E-06	NA	1.1E-04	0.1	ND	ND	NA	ND	0.0
Cobalt	8.6E+00	1.9E-06	4.1E-06	NA	2.8E-07	5.9E-07	NA	3.2E-05	6.9E-05	NA	1.0E-04	0.1	ND	ND	NA	ND	0.0
Copper	4.1E+01	9.1E-06	1.9E-05	NA	1.3E-06	2.8E-06	NA	8.2E-04	5.3E-04	NA	1.4E-03	0.8	ND	ND	NA	ND	0.0
Lead	9.4E+01	2.1E-05	4.5E-05	NA	3.0E-06	6.4E-06	NA	ND	ND	NA	ND	0.0	ND	ND	NA	ND	0.0
Manganese	7.3E+02	1.6E-04	3.5E-04	NA	2.3E-05	5.0E-05	NA	2.9E-02	2.5E-03	NA	3.2E-02	19.6	ND	ND	NA	ND	0.0
Mercury	4.1E+00	9.2E-07	2.0E-06	NA	1.3E-07	2.8E-07	NA	3.1E-03	6.6E-03	NA	9.6E-03	5.9	ND	ND	NA	ND	0.0
Nickel	1.9E+01	4.2E-06	9.0E-06	NA	6.1E-07	1.3E-06	NA	5.3E-03	4.5E-04	NA	5.7E-03	3.5	ND	ND	NA	ND	0.0
Selenium	8.5E-01	1.9E-07	4.1E-07	NA	2.7E-08	5.8E-08	NA	3.8E-05	8.2E-05	NA	1.2E-04	0.1	ND	ND	NA	ND	0.0
Thallium	4.4E-01	9.9E-08	2.1E-07	NA	1.4E-08	3.0E-08	NA	1.2E-03	2.6E-03	NA	3.9E-03	2.4	ND	ND	NA	ND	0.0
Vanadium	2.2E+01	5.0E-06	1.1E-05	NA	7.1E-07	1.5E-06	NA	2.7E-02	1.5E-03	NA	2.9E-02	17.8	ND	ND	NA	ND	0.0
Zinc	1.6E+02	3.5E-05	7.5E-05	NA	5.0E-06	1.1E-05	NA	1.2E-04	2.5E-04	NA	3.7E-04	0.2	ND	ND	NA	ND	0.0
					Total Risks:			1.2E-01	4.0E-02	0.0E+00	1.6E-01	100.0	2.2E-05	2.2E-05	0.0E+00	4.4E-05	100.0

Notes:

This scenario is for the residential sediment exposure pathway, utilizing the exposure point concentrations for SVOCs/PAHs from sediment sample SD07. The PAH concentrations detected in this sample are not believed to be related to the NPL site, thus this sample was not included in the overall sediment exposure risk analysis.

1. Adsorbed doses were calculated for dermal contact with the medium, and intakes were calculated for ingestion or inhalation of a medium.
2. For noncarcinogenic effects, the chronic daily intake (CDI) is averaged over the exposure period; whereas for carcinogenic effects, the CDI is averaged over the lifetime (i.e., 70 years). Therefore, the difference between the CDI for noncarcinogenic vs. carcinogenic effects is due to the different methods of time weighting used to estimate the value.
3. A noncancer risk estimate (HQ) of greater than 1 indicates the potential of noncancer effects (e.g., liver disease) to occur in humans exposed at an assumed level and duration to a contaminated medium. A cancer risk level of greater than 1.0e-06 (i.e., one in a million) is above the U.S.EPA's point of departure for Superfund Sites.
4. Hazard quotient and cancer risks are unitless values which represent the probability of incurring an adverse health effect. These risk values are calculated using the following relationships:
   Hazard Quotient = Chronic Daily Intake / Reference Dose
   Cancer Risk = Chronic Daily Intake x Slope Factor
5. Hazard Quotients and cancer risks are summarized for applicable routes of exposure. Values for each route are summed to arrive at a total exposure pathway risk. The percentage of total risk is also shown for each compound. In some cases, risks were not determined (ND) because a reference dose or slope factor was not available. NA indicates the route is not applicable.

Legend:
EPC = Exposure Point Concentration

Photograph 1 - Floodplain Forest Community

Photograph 2 - Forested Edge of Wetland Slough

Photograph 3 - Rock River Backwater Lake

Photograph 4 - Wetland Slough

Photograph 5 - Rock River

Photograph 6 - Off-Site River Discharge

Photograph 7 - FSDA Cottonwood-Willow Complex

Photograph 8 - Clarify Pond Cottonwood-Willow Complex

Photograph 9- Gravel Pit Cottonwood-Willow Complex

Photograph 10 - FSSA Ruderal Prairie Community

Photograph 11 - FSSA Ruderal Prairie Community

Photograph 12 - Prairie-Forest Edge Habitat

F

DATA QUALITY SUMMARY

APPENDIX F

DATA QUALITY SUMMARY

ANALYTICAL DATA QUALITY SUMMARY

Analytical data generated during the Beloit Corporation - Blackhawk Facility RI have been computerized in a format organized to facilitate data review and evaluation in Appendix G of the RI Report (Montgomery Watson 1999). All compounds included in the applicable analyses are presented for each sample. Each sample has three columns: 1) concentration detected (identified by the appropriate units), 2) laboratory qualifiers (LQ) and data validation qualifiers (DVQ) and 3) reported detection limit (RDL). RDLs have been corrected for any dilutions. Note that a blank in the concentration columns indicates the compound was not analyzed for in the particular sample.

The qualified data from Appendix G was then used for the identification of COPCs and EPCs for Tables 3-1 through 3-7 of the BlRA. Blanks or not listed compounds in these tables indicate that the compound was not detected at concentrations above its RDL. Refer to Appendix G of the RI report for the specific detection limits for each of the compounds and samples.

SUMMARY OF DATA QUALIFIER DEFINITIONS

Laboratory qualified data are flagged by the performing laboratory. Data may be further qualified by Montgomery Watson personnel during the data validation process. Data qualifiers are letter or symbol codes as outlined below. If data are qualified, the qualifiers are presented with results. The laboratory qualifiers (LQ) and data validation qualifiers (DVQ) are presented with the data, separated by a "/".

Laboratory Qualifier Definitions

The following qualifiers were used by laboratories performing the various analyses. The qualifiers defined below are presented in the "LQ" column adjacent to the result. Note: all possible relevant qualifiers potentially used by the laboratory for VOC analysis are included here for reference, whether they apply to these specific results or not.

The laboratory-provided qualifiers will include:

- Non-detects
- Concentration below required detection limit
- Estimated concentration due to poor QC data
- Concentration of chemical also found in the laboratory blank.

Laboratory Qualifiers for Organic Analysis

- U - Indicates the compound was analyzed for, but was not detected. The sample quantitation limit is corrected for dilution and, in the case of soil samples, for percent moisture.

- J - The associated numerical value is an estimated quantity, because the value was less than the CRQL. TICs are flagged as estimated (J).

- N - Indicates presumptive evidence of a compound. This flag is only used for TICs where a specific compound identification is based on a mass spectral library search.

- B - This flag is used when the compound is found in the associated blank as well as in the sample. It indicates possible/probable blank contamination and warns the data user to take appropriate action.

- E - This flag identifies a compound where the concentration exceeded the calibration range of the instrument for that specific analysis. If one or more compounds have a response greater than full scale, the sample or extract must be diluted and re-analyzed. If the dilution of the extract cause any compounds identified in the first analysis to be below the calibration range in the second analysis, then the results of both analyses are reported.

- D - This flag identifies a compound that was identified in an analysis at a secondary dilution factor.

- P - This flag is used for a pesticide/PCB target compound when there is greater than 25% difference for the detected concentrations between the two GC columns. The lower of the two values is reported.

- C - This flag applies to pesticide/PCB results where the identification has been confirmed by GC/MS.

- A - This flag indicates that a TIC is a suspected aldol condensation product.

- X - X, Y, and Z flags may be used by the laboratory to properly define the results. In this project, X is used to indicate results that were manually calculated (as opposed to computer generated) by the laboratory.

Laboratory Qualifiers for Inorganic Analyses

- K - This flag is applied to a value greater than or equal to the instrument detection limit (IDL), but less than the Practical Quantitation Limit (PQL). (Note: in order to prevent confusion, Montgomery Watson uses "K" instead of the "B" laboratory qualifier for inorganics as used by the EPA to indicate the result is 'bracketed' by the ICL and CRDL. This laboratory qualifier does not indicate blank contamination for inorganic analyses.)

- U - Indicates analyte was analyzed for, but was not detected. The value reported is the instrument detection limit value (e.g., 10U).

- E - Indicates the value is estimated due to the presence of interference.

- S - Indicates the value was determined by the method of standard addition.

- M - Indicates duplicate injection precision for furnace analysis was not met.

- N - Indicates spike sample recovery was not within control limits.

- * - Indicates duplicate analysis was not within control limits.

- + - Indicates the correlation coefficient for method of standard addition was less than 0.995.

- W - Post-digestion spike for Furnace AA analysis was out of control limits (85-115%), while sample absorbance was less than 50% of spike absorbance.

Data Validation Qualifier Definitions

The data validation process was performed with specific project needs in mind. Data quality objectives and intended data usage, as outlined in the QAPP, were referred to. The data validation qualifiers defined below are presented with the data under the "DVQ" column.

The data validation/review qualifiers will indicate whether the data are,

- Usable as a quantitative concentration
- Usable with caution as an estimated concentration
- Unusable due to out-of-control QC results.

The following qualifiers were used by Montgomery Watson personnel in the validation of laboratory results. Field QC samples (trip blanks, field blanks, field duplicates) were also evaluated during the data validation process. Validation of organics data was performed using *USEPA Contract Laboratory Program National Functional Guidelines for Organic*

Data Review, U.S. EPA, February 1994. Inorganics data validation was performed using *USEPA Contract Laboratory Program National Functional Guideline for Inorganic Data Review*, U.S. EPA, February 1994.

Data Validation Qualifiers for Organic Analyses

- J - The associated numerical value is an estimated quantity, because quality control criteria were not met and/or because the value was less than the CRQL. TICs are flagged as estimated (J).

- U - Indicates compound was analyzed for, but was not detected. The associated value is the sample quantitation limit. The sample quantitation limit may be elevated due to contamination detected in laboratory blanks, field blanks, or, in the case of VOCs, trip blanks.

- UJ - Indicates the compound was analyzed for, but was not detected. The associated numerical value is an estimated quantitation limit.

- R - Quality control indicates the result is not usable (compound may or may not be present).

Data Qualifiers for Inorganic Analyses

- J - The associated numerical value is an estimated quantity because quality control criteria were not met (i.e., out of control (low or high) spike recoveries, interferences in serial dilution, or poor correlation coefficients).

- R - Quality control data indicates that the value is not usable (analyte may or may not be present).

- U - Indicates analyte was analyzed for, but was not detected. The associated value is the sample quantitation limit. The sample quantitation limit may be elevated due to contamination detected in laboratory blanks or field blanks.

- UJ - The analyte was analyzed for, but was not detected. The associate numerical value is an estimated quantitation limit.

SUMMARY OF QUALIFIED DATA

Data qualified "J" (estimated) during the validation/review process is considered acceptable for use in the Baseline Risk Assessment, and is not discussed here. Only results qualified as "R" (unusable) are considered unacceptable for use in the Baseline Risk Assessment.

Unusable Data

The following analytical data collected during Phases I-IV of the RI has been qualified during the review/validation processes as unusable:

- All private well samples for the following volatile organic compounds were qualified as unusable ("R"), due to calibration response factors being out of acceptable QC limits:
  - 1,2-dibromo-3-chloropropane
  - 2-butanone
  - 2-hexanone
  - Acetone

- Bis(2-ethylhexylphthalate (BEHP) results for BC-GWW20B-01 and BC-GWW20B-91 were qualified unusable ("R") due to obvious contamination of the field duplicate. W20B-01 contained BEHP at 8 ug/L, while the field duplicate W20B-01 contained BEHP at 1200 ug/L. The remaining samples included in this delivery group contained BEHP, attributable to blank contamination, at concentrations of 0.55 to 12 ug/L.

- Semivolatile results for the following samples are qualified unusable for site evaluation. The initial extraction set was improperly labeled, and samples could not be accurately identified. The re-extraction/analysis was performed 28 days after sampling and is therefore unusable.
  - BC-SSSB23-22
  - BC-SSSB26-08
  - BC-SSSB28-25
  - BC-SSSB28-32
  - BC-SSSB29-28
  - BC-SSSB36A-08
  - BC-SSSB37-08
  - BC-SSSB37-34
  - BC-SSSB38-03
  - BC-SSSB38-08

- Semivolatile results for non-detected compounds in sample BC-SSSB23-10 are qualified as unusable due to the hold time of 42 days exceeding the 14 day maximum. Detected compounds are qualified as estimated.

- Antimony results for 12 soil boring samples and all surface soil samples are qualified as unusable due to spike results being less than 30%.

- Selenium results for 12 soil boring samples are qualified as unusable due to spike results being less than 30%.

- Semivolatile surrogate recoveries for BC-SW01-93 were low. The re-extraction was 2 weeks past hold times, and is therefore flagged unusable. Note that all SVOC results for SW01-03 are acceptable.

- BC-GWFB03-03 – This field blank was collected through the Keck pump immediately after collecting samples from monitoring wells W23B and W23 (the two wells with the greatest concentrations). PCE and several additional compounds were detected in this field blank. All laboratory QC was acceptable for this sample, however, no additional samples were collected after this field blank. As such, results from GWF03-03 were not used to qualify data from any of the round three samples. Note the results for GWFB01-03 and GWFB02-03 were both acceptable, with only minor detects of acetone in GWFB02-03.

- BC-GWFB01-05 - This field blank contained acetone, chlorobenzene, chloromethane, 2-butanone, and toluene. Sample results were qualified, using the 5x/10x rule, as undetected at the sample result or the CRQL, whichever was greater.

- BC-GWTB01-05 contained acetone, chlorobenzene, chloromethane, and methylene chloride. Sample results were qualified, using the 5x/10x rule, as undetected at the sample result or the CRQL, whichever was greater.

The remaining data for samples collected during the RI field activities were deemed acceptable for use in the further site evaluations.

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ECOLOGICAL RISK ASSESSMENT SUPPLEMENTARY INFORMATION

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ecological Services
Rock Island Field Office
4469 48th Avenue Court
Rock Island, Illinois 61201
Tel: 309/793-5800 Fax: 309/793-5804

IN REPLY REFER TO:
FWS/RIFO

October 26, 1999

Michael W. Kierski
Montgomery Watson
One Science Court
P.O. Box 5385
Madison, WI 53705-0385

Mr. Kierski:

This letter responds to your letter dated September 29, 1999, requesting information on potential threatened or endangered species that may occur in Winnebago County near Rockton, Illinois. In your letter you state the information will be used to prepare an Ecological Risk Assessment.

We are furnishing you with the following list of species which may be present in the concerned area:

Classification	Common Name (Scientific Name)	Habitat
Threatened	bald eagle (*Haliaeetus leucocephalus*)	along large rivers lakes and reservoirs
Threatened	prairie bush clover (*Lespedeza leptostachya*)	dry to mesic prairies with gravelly soil

The threatened bald eagle (*Haliaeetus leucocephalus*) is listed as wintering along large rivers, lakes and reservoirs in Winnebago County, Illinois. During the winter, this species feeds on fish in the open water areas created by dam tailwaters, the warm water effluents of power plants and municipal and industrial discharges, or in power plant cooling ponds. The more severe the winter, the greater the ice coverage and the more concentrated the eagles become. They roost at night in groups in large trees adjacent to the river in areas that are protected from the harsh winter elements. They perch in large shoreline trees to rest or feed on fish. There is no critical habitat designated for this species. The eagle may not be harassed, harmed, or disturbed when present nor may nest trees be cleared.

The prairie bush clover (*Lespedeza leptostachya*) is listed as threatened in Winnebago County in Illinois. It occupies dry to mesic prairies with gravelly soil. There is no critical habitat designated for this species. Federal regulations prohibit any commercial activity involving this

species or the destruction, malicious damage or removal of this species from Federal land or any other lands in knowing violation of State law or regulation, including State criminal trespass law. This species should be searched for whenever prairie remnants are encountered.

Thank you for the opportunity to provide comments. If you should have any further questions regarding this project, please contact Kevin de la Bruere of my staff at extension 530.

Sincerely,

for Wayne A. Fischer

Richard C. Nelson
Supervisor

Illinois
Department of
Natural Resources

524 South Second Street • Springfield, Illinois 62701-1787

http://dnr.state.il.us

George H. Ryan, Governor • Brent Manning, Director

November 3, 1999

Michael W. Kierski, Ph.D.
Montgomery Watson
One Science Court
P.O. Box 5385
Madison, WI 53705-0385

Re: Information Request, Winnebago County

Dear Mr. Kierski:

I have reviewed the Natural Heritage Database for the presence of endangered and threatened species, Illinois Natural Area Inventory (INAI) sites, and dedicated Illinois Nature Preserves within a one-mile radius of the site location in Winnebago County. Following are the results of that review.

There is a known occurrence of the state-listed plant, Kitten tails (*Besseya bullii*) in T46N, R1E, Section 7/12. This plant occurrence is adjacent to the Rock River. Additionally, this plant and the state-listed Dragon wormwood (*Artemesia dracunculus*) are known to occur in the NE 1/4 of Section 14, T46N, R1E, south of South Bluff Road.

Please be aware that the Natural Heritage Database cannot provide a conclusive statement on the presence, absence, or condition of significant features in any part of Illinois. The reports only summarize the existing information regarding the natural features or locations in question known to the Division of Natural Heritage at the time of the inquiry. This response should not be regarded as a final statement on the site being considered, nor should it be a substitute for field surveys required for environmental assessments.

If you need additional information or have any questions, please do not hesitate to contact me at 217-785-5500.

Sincerely,

Heather C. Hostetler

Heather C. Hostetler
Environmental Database Specialist
Division of Resource Review & Coordination